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FOOD MANUFACTURE

FOOD MANUFACTURE

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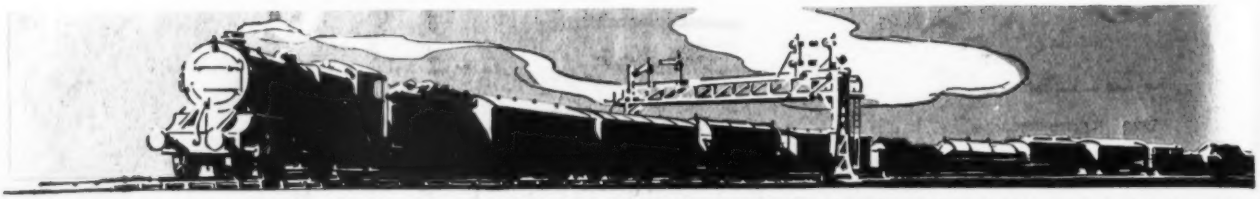

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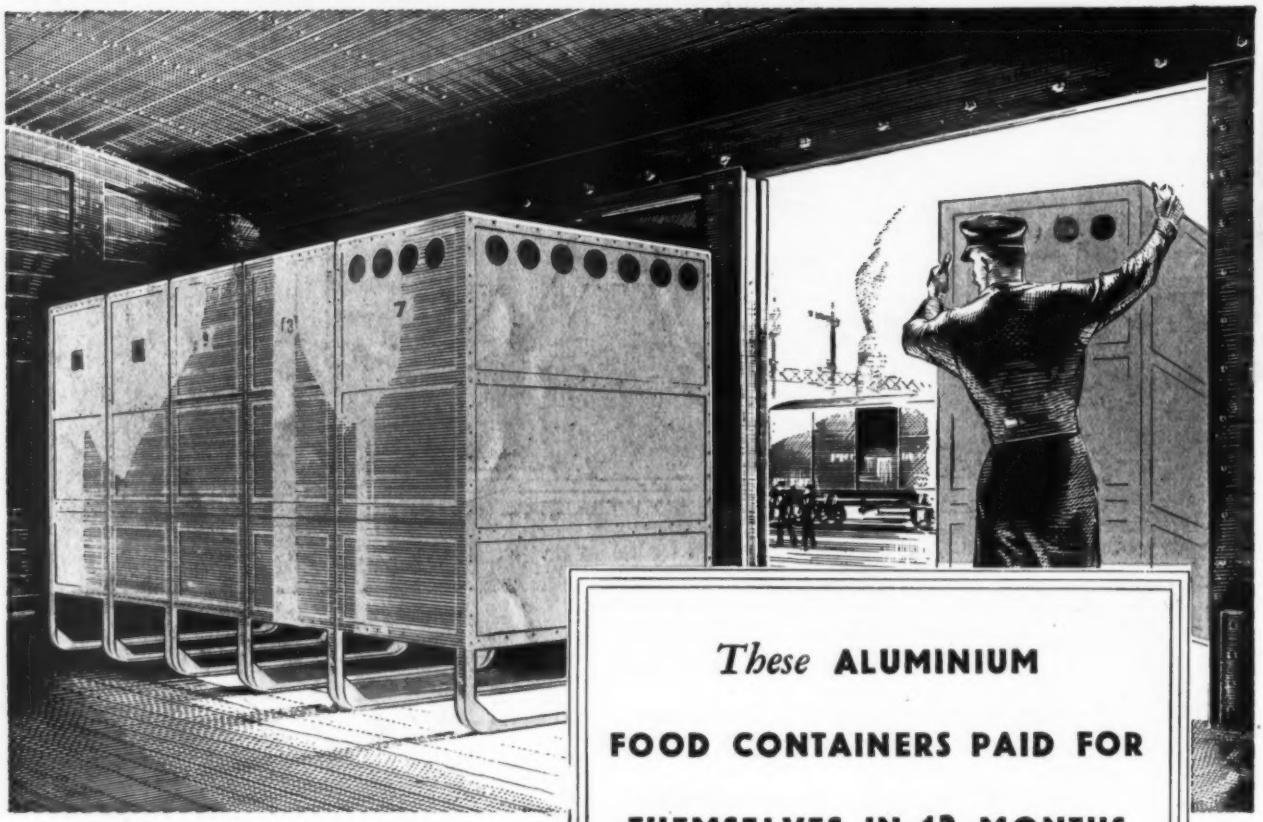

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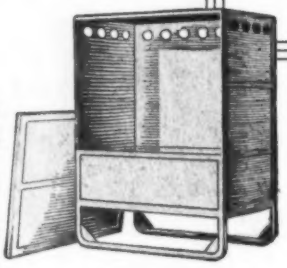

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FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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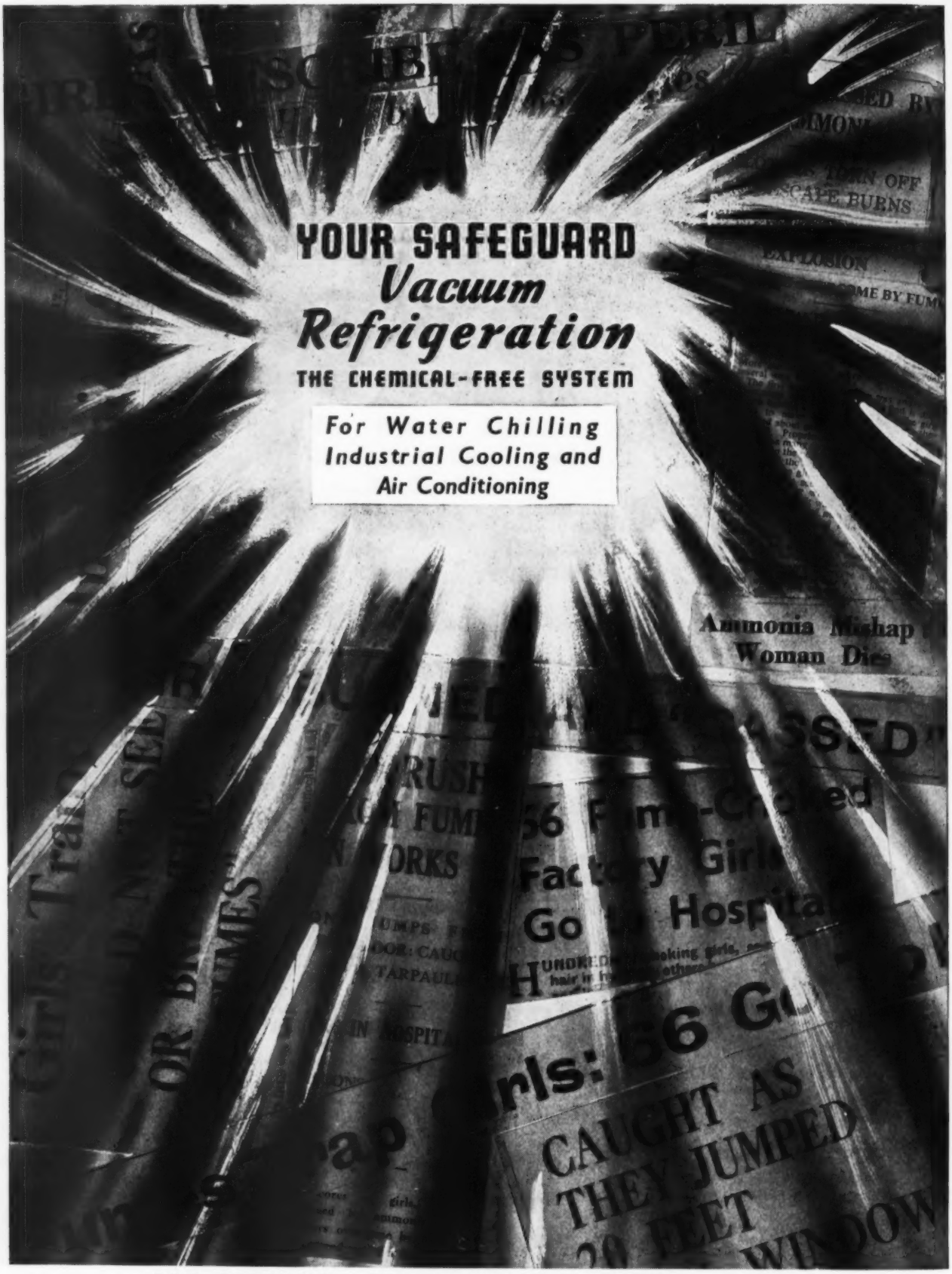

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FOOD MANUFACTURE

Vol. XIII, No. 8 August, 1938

Chocolate Confectionery

A HUNDRED years ago our consumption of cocoa was scarcely 500 tons per annum, or the equivalent of about two days' supply to-day. We have been familiar with drinking chocolate since the seventeenth century, but this remarkable increase in the consumption of cocoa may be said to date from 1828, when the famous Dutch firm of Van Houten introduced a process whereby the natural cocoa butter was expressed from the cocoa-bean in order to produce a more palatable drinking cocoa. A use had to be found for this by-product, and eventually it was added to a mixture of cocoa and sugar to produce a plastic mass suitable for consumption as a sweetmeat, and chocolate was the result.

The last Census of Production shows some interesting trends between 1930 and 1935 on the production side. The total quantity of cocoa products in that period rose from 3,345,000 cwt. to 4,449,000 cwt., an increase of 33 per cent., while the value of production fell from £21,645,000 to £20,613,000, or 5 per cent. Each class of chocolate confection showed a fall in value of the product. The output of moulded chocolate in bars and blocks, including those with nuts and raisins, in 1930 was 1,088,000 cwt., in 1935 it was 1,434,000 cwt., and the value rose from £7,388,000 to £7,690,000—a 32 per cent. rise in quantity but only a 4 per cent. rise in value. In the case of moulded chocolate with cream centres the output in 1930 was 1,591,000 cwt., valued at £10,947,000, while in 1935 the corresponding figures were 1,864,000 cwt., valued at £9,425,000—a rise of 17 per cent. in quantity but a fall of 14 per cent. in value.

The trend in sugar confectionery was similar. Output rose from 3,945,000 cwt. to 4,496,000 cwt., while the value dropped from £14,525,000 to £13,982,000—a rise of 14 per cent. in output and a fall of nearly 4 per cent. in value.

In the confectionery industry as a whole the value of the output was about the same at the time of both surveys. Costs of raw materials, fuel and electricity declined during the period. The numbers engaged in the industry rose slightly to 72,941, while the net output per person employed increased from £224 to £238.

Agriculture and Defence

There seems to be some confusion about the Government's views on the position of agriculture in the scheme for national defence, and a number of outspoken comments have been made. Naturally agriculturalists and the spokesmen of farmers think there is nothing in the country so important as farming in the national assets. *The Farmer and Stockbreeder*, in a leading article, recently said, "So far, there has been no definite statement regarding the part that farming would be expected to play. There have only been generalities about increased production by improving the fertility of the soil. The Land Fertility Scheme would appear to be the Government's last word on the matter". It goes on to say that when it comes to the pinch, increased agricultural production can come only from our own land. We agree, but do we really need a greatly increased production? An increased home production would need greater man power, and in war-time there will be no spare men. We, ourselves, still place great reliance on the correct storage of food. We agree with the Prime Minister's much-criticised Kettering speech, when he said that, "the idea that we can be starved-out in war seems to me entirely fallacious". He emphasised the need for the provision of certain reserves to tide over the first emergency period, and also the necessity for easing the strain on our shipping and Navy by reducing the amount of cargo-space required. This, he suggested, could be done by emergency food growing, plans for which are already made. To increase home production in peace-time to meet the unknown requirements of a problematical war seems fantastic and would be hopelessly uneconomic and likely to antagonise our Empire suppliers. In our

view the Prime Minister's policy is justifiable. Adequate storage and plans for emergency growing should see us through. If our Navy becomes so weak that it cannot protect our foodships then we shall have already lost the war.

Food or Houses?

It seems a curious anomaly that while agriculturalists are crying out for an increased agricultural production some of the best land for farming in the country is being lost to agriculture by the insane wave of house-building which has swept the country in recent years. This matter was ventilated the other day by Mr. J. C. Leslie, the Principal of the East Anglian Institute of Agriculture, in a discussion on the sterilisation of certain land for agriculture. There is an increasing demand for fresh fruit and vegetables, and in some counties like Essex only a limited amount of land is available for this purpose, and surely this should be used in this way, instead of housing a mass of jerry-built dwellings. Poor land, unsuited for good agriculture, should be used for building. Mr. Leslie stressed his point so much at a meeting of the Rayleigh Urban District Council that in spite of vigorous opposition a committee was formed to consider the advisability of zoning part of the land in the area for agricultural and horticultural purposes. It seems absurd to be littering up supremely fertile land with houses and roads and smug little suburban gardens when it could be used to supply the big cities with fresh food. Of course the whole problem is complicated by vested interests, and naturally the people involved in the toils of the building estate ramp will object, but it is surely a national concern. We are a very small country with a big population and we cannot afford to waste any fertile land for the sake of building houses, many of which are speculative and unnecessary.

Egg Marketing

We have on more than one occasion referred to the many difficulties in the way of the organised marketing of eggs. Scheme after scheme has been suggested only to be turned down by the poultry farmers themselves. Still some people keep on trying, and the other day the National Poultry Parliament turned down a resolution objecting to the inclusion of candling in any scheme that might be prepared for the marketing of eggs. Thus, far from giving up the idea of a scheme, this body is actually dealing with details of the scheme. We do not propose here to discuss the possibilities or impracticabilities of an egg marketing scheme. We have expressed our view that no reasonable scheme can be formulated, but we may be wrong, and if that is so and a scheme does come into being we do feel that every effort should be made to safeguard the quality of the eggs. Egg producers who want a ready market and a good price must rely on the reputation of British eggs, and if even a small proportion of doubtful eggs are sold that reputation will be seriously impaired. Nothing is more calculated to put one off eggs than the proverbial curate's egg, which is even worse than a downright rotten one. Foreign eggs coming to this country are subject to careful selection and tests, and the same care must be exercised in the case of home-produced eggs if the home market is to be secured. "Home laid" is not enough—"when laid" is far more important.

When Experts Differ

The weakness in the question of standards for jam was clearly demonstrated at Marylebone Police Court recently when a provision merchant was summoned for selling raspberry jam which was not of the nature, substance and quality required, inasmuch as it contained fruit not exceeding 30 per cent., and, therefore, was substantially deficient in fruit content. The standard laid down by the Food Manufacturers' Federation and the Society of Public Analysts was 38 per cent., and there was, therefore, a substantial deficiency in this case. The defending solicitor stated that the public analyst for Hampstead (Dr. Cox) was basing his conclusions on the figures of Mr. Macara which had since been revised. If these revised figures were used the jam was up to standard. Dr. Cox agreed that he had taken some accepted figures of 1934 as to the percentage of insoluble solids, which varied in the case of raspberries from 4·1 per cent. to 9 per cent. Using this range he concluded that the sample had less than 30 per cent. fruit. It was then pointed out that Mr. Macara, after further researches on raspberry jam, had reduced his figure for insoluble solids to 3·29 per cent. Dr. Cox, while agreeing that Mr. Macara is an authority for whom he had the greatest respect, would not accept the figure of 3·29 per cent. It seems very unfortunate for the trader that on the figures of such an undoubted expert as Mr. Macara the jam would be up to standard, but on the figures of an equally well-known authority, Dr. Cox, would be considerably deficient. When experts differ surely the defendant should be given the benefit of the doubt.

Potato Restrictions

One of the most successful of the Marketing Boards is the Potato Board, but even this has its problems, and one of the most vexed questions is the restriction of supplies, which is inevitable in any system dependent on quotas. Mr. W. Gavin, speaking at the Agricultural Economics Society at Oxford recently, said that this was the major problem facing the Potato Board. The regulation of imports presents no difficulties that are unsurmountable, but when it is a question of regulating the home crop the position is not simple and requires very careful handling. Home-grown potatoes vary according to the acreage planted and the yield per acre, and these two factors are unreconcilable. If one plants a big acreage and conditions are good and a big yield is obtained then there is a surplus. Conversely a small acreage and a poor yield would mean a scarcity. The Board has attempted to counter these by imposing an initial levy of £5 per acre on all those who plant more than their basic acreage, and also varying the size of the riddle. These have had a steadying influence. We have never favoured the artificial restriction of the production of any crop, and would rather see the bountiful results of nature passed on to the consumer in times of plenty, and the system of excess acreage seems much preferable to artificial restriction of production.

Vitamin Values

Recently, Dr. Katherine Coward published a monograph on the biological standardisation of the vitamins and thereby made an important contribution to the now rapidly developing science of nutrition. A stage further has been reached by the compilation of a new set of tables of the vitamin values of foods published in vol. 7, part 4 of *Nutrition Abstracts and Reviews*. These can also be obtained separately for the modest price of half a crown. The tables have been collected by two experienced workers in the field of nutrition from the vast literature on the subject that has accumulated in recent years. It is so vast that there was the danger of some of the fairest flowers of truth blushing unseen among the rank weeds of many pointless and inaccurate papers. The selection of values is based on the principles laid down by Dr. Coward, and only those have been admitted which have been obtained by chemical or spectroscopic methods, or by an approved process of biological standardisation which yields results in international units. No values expressed in purely biological units of animal response have been accepted, and the risky procedure of converting such biological units into international units has been wisely eschewed. These tables should prove very valuable in dietary surveys, but the intending user of them must be warned that there is no neat and fixed value for any foodstuff—indeed, the values vary over a very wide range. The vitamin values of foods do vary very much according to soil, climate, species and variety, and those who are engaged in dietary surveys must realise this. Bearing this in mind, as also the enormous potential variations in cooked and manufactured foods, we consider the tables unique and undoubtedly useful.

Betaxan

Bayer Products, Limited, have published a very interesting booklet entitled *Vitamin B_1 Therapy with Betaxan*. The study of the vitamin complexes has moved very rapidly in the last twenty years, and what were originally regarded as definite entities are now known to be groups or complexes of a number of factors. Vitamin B is now known to contain six or seven factors and one of them is vitamin B_1. The history of the discovery of vitamin B_1 dates from observations made by Admiral Takaki in 1878 and culminated in the successful synthesis by Andersag and Westphal in 1936. Once a synthesis of a natural product has been accomplished it is not long before it is available in considerable quantities in a very pure state at a relatively low price. Classical examples of this are the price reductions that followed the synthesis of alizarin (turkey red), previously obtained from madder, and of indigo. Betaxan, which is Bayer's trade name for synthetic vitamin B_1, is now available on a relatively large scale and at a relatively low price. The richest sources of vitamin B_1 are yeast and wheat germ. In the milling of white flour the germ is removed, chiefly to enhance the keeping properties of the flour. This removal obviously necessitates the depriving of the resultant flour of vitamin B_1. It is possible that an admixture of the synthetic vitamin may be made to white flour and so restore to some extent the vitamin content of whole wheat. There seem to be commercial possibilities in this.

Cake Quality

Work on objective tests for the evaluation of cake quality has been in progress at the Chicago Institute of Meat Packers for some time, and recently two very simple tests have been described. By the first a measure of the average size of the pores, or grain, of the cake can be obtained. The cake pores are filled with sand, the surplus re-

moved, and the gain in weight caused by the retained sand is recorded as a measure of the coarseness of the grain. Figures are quoted to show that a fair degree of agreement can be obtained from four samples of the same cake. By the second test the ability of the cake to take up water is determined as one possible index to the eating characteristics of the cake. The gain in weight obtained by allowing a piece of cake to remain in water for exactly five seconds is taken to represent the water-absorbing ability or "wetability" of the cake. Results given show that cakes vary in their ability to take up water and that as they become stale they lose that ability—some more rapidly than others. Since it is inherent in fresh cake a greater "wetability" is considered a desirable quality. A series of consumer acceptance tests confirmed the value of the test in this respect. A cake that resists moistening feels dry and unpleasant in the mouth, while one that is moistened rapidly with the saliva is more palatable.

Quick Freezing

Turkey from Tennessee, corn from Cortland, broccoli from Brockwayville were on the *menu* at a lunch given at Grosvenor House on July the 8th. We hasten to add that whilst our geography is shaky there was no doubt about the integrity of the meal, the components of which had been a year or so dead and their provenance the United States of America. A film showing the technical and domestic implications of quick-frosted foods rounded off the gustatory evidence submitted by Frosted Foods, Ltd., which is a new company formed to foster the development of the foods in co-operation with the British food industry. A team of technical experts has come to this country to supervise the launching of the quick-frozen foods, marketed under the Birds Eye trade mark in America. The results of eight years' pioneering work will be available to British manufacturers, and anyone who has collaborated in the inception of a new industry will appreciate the advantage of a pre-knowledge of the inevitable pitfalls which beset the neophyte.

One of the more spectacular aspects of frosted products is the possibility of the preservation and transportation, in perfect condition, of such items as human blood for transfusion purposes, mother's milk and anti-toxins.

If this country does not make a success of frosted foods, it will not be the fault of the various pioneers who are taking us under their wings. We already have the Haslacher and the "Z" processes. Mr. Smedley, we understand, has a process of his own, and is getting on with it. Now we are going to have the Birds Eye system. We can hardly imagine better auspices under which a new industry could be inaugurated.

Autarchy

Happy is the nation that can carry on its trade without having to face political obstacles. To be able to buy what we need and to enjoy those things that to-day are regarded as extra luxuries and refinements, but which to-morrow, with the march of civilisation, will form part of the people's necessities, is a privilege not universally shared.

Whatever stimulus autarchy may give to industrial research is counterbalanced by the unnecessary and unnatural demands upon industry. Attention and energy are diverted from those channels in which the industry and the state could usefully contribute to the well-being of mankind by providing such products as it was specially favoured for producing economically and successfully. These would normally be exchanged for those goods that another state could produce better and more easily. Autarchy played a sorry part in the trade depression of a few years back, yet some states are still clinging to it in principle and supplementing it by a system of barter. Roumanian oil had been exchanged for German machinery, Bulgarian agricultural produce had been bartered for German manufactures and, before the absorption of Austria, timber had been exchanged for Ruhr coal. But this retrograde step, from the viewpoint of the world at large, is not so serious as the closing of frontiers to another nation's produce.

While the world producers of tin are restricting output to eliminate unnecessary price fluctuations, we learn that in Germany old tooth-paste tubes and other containers are being collected and melted down for further use. German dentists have been reminded that they have been "wasting" over a million pounds' worth of gold annually on fillings. This is now being "put right" by substituting palladium for crowns and fillings. Hair from the hairdressers' saloons is to be put to better use than hitherto. It is to go into carpets and felt hats. No less than 300 tons are being collected annually for this purpose. In the field of *Ersatzstoffe* the most notable recent achievements are the production of *Buna* or synthetic rubber, "synthetic eggs" from fish proteins and margarine from soya bean oil. But the soya beans still have to be imported!

BEET SUGAR MANUFACTURE

W. E. CALLINGHAM*

"The beets are received at the factory . . . in trucks by rail . . ."

THE MANUFACTURE of sugar from the sugar beet (*Beta vulgaris*) may be divided into the following main divisions:

(1) Reception and storage of the beet at the factory.

(2) Washing to remove adhering soil and stones.

(3) Extraction wherein the sugar in the beet is obtained in the form of a juice leaving behind the insoluble substances of the beet.

(4) Purification to eliminate from the juice the non-sugar substances which passed out from the beet during the extraction process.

(5) Evaporation in multiple effect evaporators to remove a relatively large part of the water in the juice.

(6) Crystallisation in vacuum pans and centrifuging to produce and separate the sugar in crystalline form.

Reception and Storage

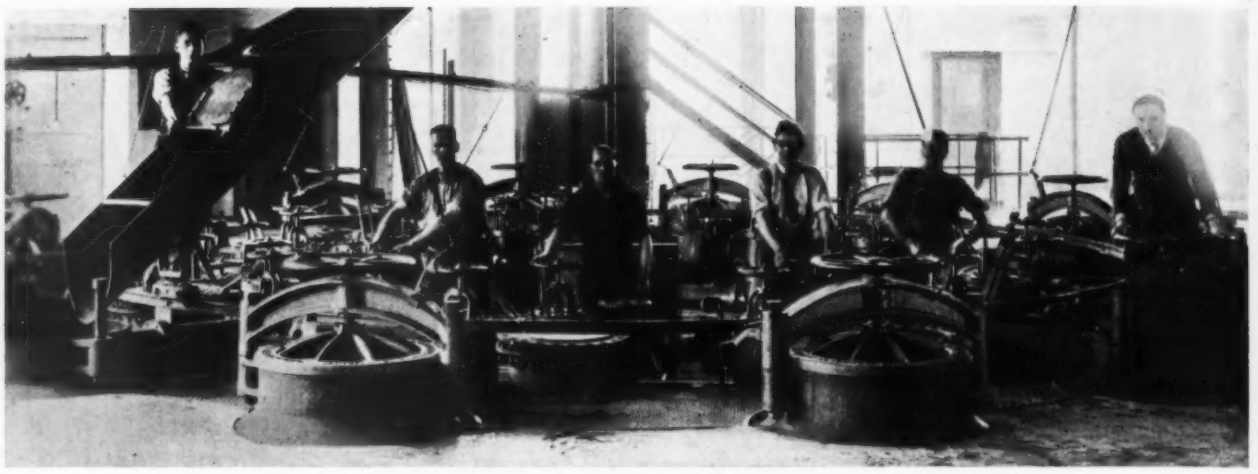
The beets are received at the factory in carts and lorries by road, trucks by rail and barges by water. Various means are used at the factories to unload the vehicles, hand unloading by means of forks and mechanical unloading by means of "water guns" being the usual method for road- and rail-borne beets, while the crane grab is the only efficient implement for handling water-borne traffic. When unloaded from the vehicles in which they were transported to the factory, the beets are stored in silos until required in the factory (except beets unloaded by the "water gun", which almost always go directly into process), whence they are transported through a system of channels, called "flumes", by a current of water. The construction of the silos is such as to permit of easy handling of the beets into the flumes, which actually form an integral part of the silo, being formed by a narrow channel at the bottom of the silo and covered by "flume boards" until it is required to feed beets into the running flume. For the transport of beets by water in the flumes approximately 500 per cent. of water on beets is needed. It is customary to keep a reserve of beets equivalent to six to eight days' requirements in the silos to avoid shutting down, when climatic or other conditions render the delivery of beets difficult or impossible.

Washing

The beets as received at the factory have soil in more or less considerable quantities adhering to them, and it is imperative to remove this as completely as possible to avoid damage to the slicing equipment and to prevent the introduction of mineral impurities into the juice at the diffusion. The actual washing takes place in a specially designed washer, which usually takes the form of a half-cylindrical trough 20 to 30 feet long and 6 to 8 feet wide, in which a series of paddles lifts the beets and generally agitates them in the water contained in the washer, so that the adhering soil is removed by washing while the beets are damaged as little as possible. Above all, the time of contact is as short as possible so as to avoid loss of sugar in the wash water.

The washers are usually equipped with pits into which the stones and other heavy extraneous matter will collect,

* Chemical Engineer in charge of Technical Division, Utilities Improvements, Ltd.



Diffusion Batteries for Extraction.

while the soil and lighter substances escape with the muddy water through perforations in the bottom of the washer. The washed beets are now elevated to the top of the factory building, examined as they traverse a "picking table"—where experienced workmen quickly detect and remove the stones or vegetable matter which have escaped the washer—weighed in automatic scales capable of weighing up to 1 ton (with less than 10 lb. error), from which they fall into a bin over the "slicing machines" and, forming an integral part of the machines, being continuously drawn therefrom as beets are automatically fed through the slicing machines to produce fine slices suitable for the next operation.

Extraction

The process of extracting the sugar from the beets is known as diffusion, although it would appear that the principles of osmosis as well as those of diffusion are much in evidence during the operation. In this operation the beet slices are brought into contact with juice or water in such fashion that the fresh slices (cossettes) are brought into contact with the richest juice in the system, while the almost exhausted cossettes are brought into contact with water. The system is known as that employing "counter-current" principles.

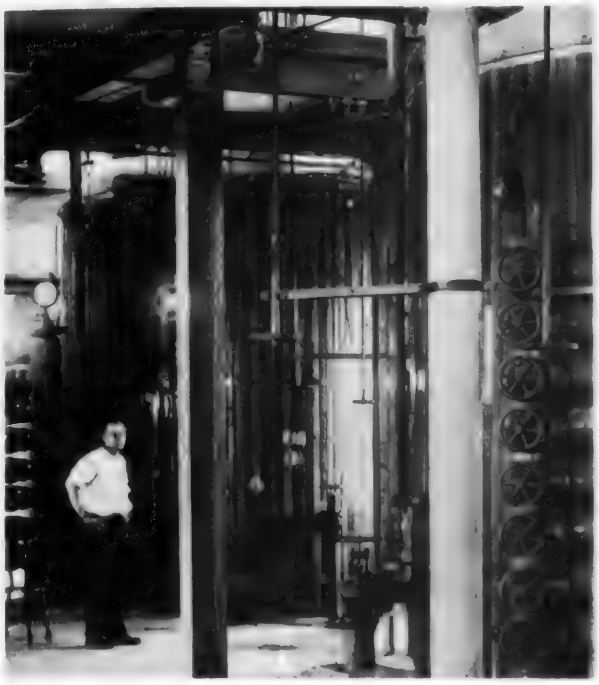
For really efficient extraction, the best possible cossettes must be produced; and much care and research has been devoted during recent years to the production of machines which will produce ideal cossettes. Knife systems have undergone many changes during recent years, and it would not be incorrect to say that the present-day machines produce cossettes which are as nearly perfect as possible.

Such machines consist essentially of a chamber to contain the beets and a drum system (either horizontal or vertical) holding a series of special knives which, when rotated, cut from the beets which are being pressed against them by the weight of the mass of beets above, long thin triangular cross-sectioned slices.

Extraction proper is carried out in the diffusion battery consisting of a series of up to sixteen cells into which the cossettes are fed at the top. These cells are so connected by piping systems that the juice from the preceding cell —after passing through a heater, called an inter-cell calorisator—enters the next cell at the top. The juice, after circulating more or less evenly through the mass of cossettes in the cell (during which operation it extracts sugar from the cossettes contained therein) passes either to the next cell or, if the last cell traversed is that one containing fresh cossettes, to the measuring tank and thence to the purification. During this period water has been fed into the cell containing the most exhausted cossettes.

Of recent years a continuous system of diffusion has been evolved and is in operation in five factories in the United Kingdom. This process has the great advantage of requiring considerably less labour for its operation, but compared with the older "battery system" the after-season repair bills are much greater. The diffuser consists of a horizontal drum about 85 feet long and 12 feet

Juice Heaters.



A Vacuum Pan.

diameter divided into 23 sections by means of special screens across the lower diameter of the trough and lifting and mixing paddles, which agitate the cossettes in the juice in the sections and lift them into the next section. The whole is mounted at a few degrees from the horizontal to ensure the flow of juice from the upper to the lower end and receives scalded cossettes in the lower section and water in the upper section. The cossettes are slowly conveyed to the upper end of the trough, and the water, becoming stronger section by section, slowly passes from the upper sections to the lower, from whence it emerges as juice.

Whatever may be the apparatus used for the extraction of the sugar, the juices obtained are not appreciably different, and the exhausted cossettes are invariably pressed to remove water and finally dried in special drum driers to produce cattle food.

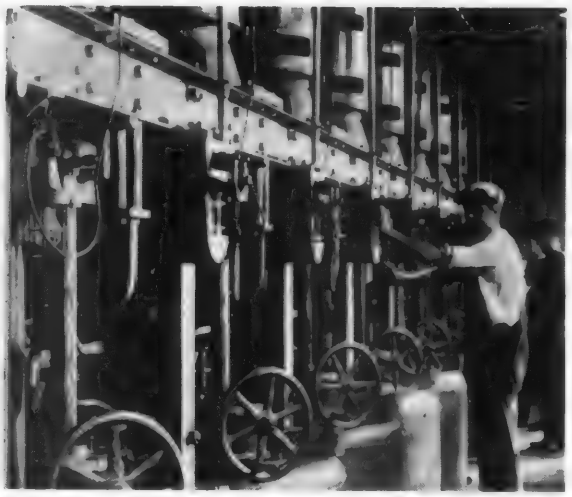
Purification

The juice leaving the diffusion battery is quite impure, the percentage of sugar on dry substance in the juice ranging from 85 to 88. The carbonation process with or without modification is universally used for purification, and consists of treating the juice with lime (CaO) either as milk of lime or as lime in lumps (quicklime), and after a more or less prolonged period of contact the limed juice is subjected to carbonation, in which the bulk of the lime is converted to calcium carbonate. Carbonation is carried out in tanks provided with valves for the introduction and discharge of the juices and also a carbon dioxide gas distributor system. The gas is obtained from the kilns in which the limestone ($CaCO_3$) and coke are burned to produce the quicklime.

Considerably more lime is employed than that required for purification alone. The amounts usually employed vary between 1·8 and 2·8 per cent. on beets, while the amount required for purification only amounts to about 0·4 per cent. There is a process largely and successfully used in Continental Europe wherein only 0·4 per cent. CaO on beets is used, but so far this process has not found favour in the United Kingdom.

At the first carbonation an amount of lime equal to 0·1 gm. per 100 c.c. is left in the juice, which is heated and filtered in "plate-and-frame" presses or Oliver drum filters, following thickening in Borden thickeners. The filtrate is subjected to a second carbonation, a second filtration and, finally (in most cases), a sulphitation, which is a saturation using sulphur dioxide gas, and then another filtration, giving a filtrate known as Thin Juice.

Filter Presses for Juice Filtration after Carbonation.



Centrifugals.

The saturations (carbonations and sulphitation) may be done in either batch or continuously operating apparatus. The usual form consists of a series of tanks capable of holding about 3 to 4 times the volume of juice actually treated therein, so as to allow sufficient free-board for foaming, which are used in rotation. There is only one factory in the United Kingdom working the continuous system, which is the subject of a large number of patents and of which a description here would be too lengthy and out of place.

The Thin Juice, which is of a light yellow colour and may be of 93 per cent. purity, is now ready for the next stage in the manufacturing process.

Evaporation

The Thin Juice, which enters the evaporation stage, contains only about 15 per cent. sugar and must be concentrated to a point just short of the crystallisation point, so that about 75 per cent. of the water present in the Thin Juice must be removed, bringing the concentration of sugar up to about 60 per cent.

Evaporation is a continuous process, the liquors flowing progressively through one body to the next, and so on, the vapour generated in the one body serving to heat the heavier liquor in the next body. Part of the vapours evolved are used for heating in other stages of the manufacturing process, and great economy may result from the efficient design and handling of this station.

During evaporation some of the soluble mineral impurities become insoluble, and another filtration of the heavy liquor, or syrup as it is called, is necessary. This filtration is variously done in plate-and-frame filters or in enclosed bag filters of the Danek type. The use of sand filters and decolorising carbons at this stage is now practically discontinued in the United Kingdom.

In some cases the syrup is subjected to a sulphitation by sulphur dioxide gas not unlike the third saturation which follows the second carbonation. It then undergoes another filtration before it becomes suitable for the next stage.

Crystallisation

This operation is carried out in vacuum pans, which work on the batch or intermittent system. Syrup is drawn into the pan and evaporation is carried on until the pan is filled with a mixture of crystals and supersaturated mother-liquor. This mixture, known as the Massecuite or Fillmas, is discharged into a mixer and fed to centrifugals, where the crystals are separated from the mother-liquor. The mother-liquor, which still contains a large amount of sugar, is sent to another vacuum pan, in which it is concentrated, yielding a batch of lower-grade sugar. This operation may be repeated on the second batch of mother-liquor, thereby yielding still another batch of lower-grade sugar and final molasses, the latter being a mother-liquor from which no more sugar can be economically separated. The first sugar, mentioned above, after separation in the centrifugal, is washed in the same apparatus and sometimes steamed there. It is then conveyed to a drier, where, by means of a current of hot air, the final traces of moisture are removed. After cooling and screening, it is weighed into bags ready for dispatch from the factory.

The final molasses are utilised in the manufacture of molassed pulp—in which are used the exhausted cossettes already mentioned—or are sold to makers of alcohol.

The Exterior of an English Beet Sugar Factory.

This photograph and the others in this article kindly supplied by the British Sugar Corporation, Ltd.

NEW CONFECTIONS FOR THE SMALLER MANUFACTURER

N. F. Scarborough, A.M.I.Mech.E.

(Author of *Sweet Manufacture*)

IN COMMON with most luxury trades, from the motor-car industry to the designing and production of ladies' wear, the confectionery industry follows that fickle jade, Dame Fashion. Some years ago a great percentage of the lines offered to the public by the confectionery manufacturer consisted of slabs or blocks of some particular confection very simply wrapped.

From the shop-keeper's point of view they had certain advantages in that no losses occurred through "turn of scale" or evaporation. There is no doubt, however, that such items as toffee were an unmitigated nuisance to the shop-keeper, not to mention the consumer, as anyone who has been rash enough to experiment in the darkness and warmth of a cinema will readily appreciate.

Wrapped Sweets

At a later period the advent of wrapping machinery heralded the introduction of the individually wrapped piece, and this development was hailed as a step in the right direction. Unfortunately, large and excessive amounts of wrapping paper are frequently used, giving rise to a feeling on the part of many consumers that they are being asked to pay for a good deal of something they cannot eat and whose disposal is under many circumstances a nuisance.

Still later, as far as the caramel, toffee and sugar boiling sections of the industry were concerned, the "cut and wrap" caramel-making machine represented a further step. This arrival provided a means of cheapening production, but from the consumer's point of view there was no advantage as the sweets themselves had not such a good appearance, while sticking of the paper to the contents was more prevalent. Despite the additions of further amounts of wrapping papers in the form of an inner lining, these objections largely hold good at the present time.

Fancy Chocolates

As to the side of the industry interested primarily in fancy chocolate production, the phase of the lavish adornment of boxes seems to be on the wane and simpler packings to be the vogue. There is to be noticed a great tendency on the part of the chocolate industry generally to enter further and further into what was formerly the province of the smaller manufacturer by the introduction of "filled blocks" of convenient size and sold at a very competitive price.

All this would appear to be a retrograde step in many ways, being a return to a form which, although convenient to handle so long as the wrapper remains unbroken, is nevertheless inconvenient and inclined to be messy once the contents of the package are exposed. However, just as it is apparently possible for the most inconvenient designs in the matter of dress to be hailed with acclamation, so with this particular item. Admittedly, a chocolate-covered sweet is not usually so bad to handle after exposure to a hot or damp atmosphere as an uncoated sugar one, and also the introduction of what to all intents and purposes are chocolates with fancy centres at the prevailing price of the blocks seems to outweigh deficiencies in other directions.

It may be that there are many smaller manufacturers who are feeling the pressure of this trend, and it is suggested to them that an incursion into this field need not be too difficult or excessively costly. The following notes on simple production requirements for this class of work may interest smaller general makers in view of the undoubted popularity of this class of confection at the present time. Novelty would seem to be the keynote of success, and in the attainment of this the smaller maker has an equal or better chance of success than the larger one.

Changes of type are much more easily carried out where the equipment is simple, and, although labour costs may be lower with fully mechanised production, the very much smaller overhead charges usually necessary in smaller establishments can often nearly offset the theoretical advantages of the complicated machine.

Filled Blocks

There is no doubt that there exists at the present time a demand for 2d. and 4d. filled blocks of various kinds, either moulded or unmoulded, and the continued popularity of a certain chocolate-covered caramel block over a period of years gives point to the argument. Further, the present tendency to hand everything to the consumer in individual wrappings untouched as to contents by hand after manufacture lends further strength to the idea.

It may be argued that an attempt to produce such lines without experience is to court disaster, but such need not be the case. In the first place, there is no need to instal

[F.M. Photo.

Examples of the Filled Block—a popular 2d. line.

expensive machinery for a trial, as the average sugar confectionery factory will contain almost all that is necessary for an experiment to see what can be done.

Broadly speaking, these blocks can be divided into two categories: (1) Those made by covering a previously formed centre by dipping, and (2) those made with the assistance of metal moulds, arranged so that separate pieces of confectionery are embedded in such a way that the block may be broken into several pieces along the indentations provided for the purpose.

It may be that the manufacturer contemplating the introduction of some such article hesitates because of the lack of facilities to produce the necessary chocolate covering or lack of knowledge of chocolate manipulation, but this need present no obstacle. Suitable couvertures can be readily bought on the open market, and there are makers who will supply an individual blend if reasonable quantities are purchased. It might be noted here that the question of bad stock does not arise as, properly stored, blocks of couverture improve with keeping, the safe period not being limited to months but years.

As to manipulation, common sense and the ability to watch details are the chief necessities. It is presumed that the manufacture of suitable fillings presents no difficulty and that they can be moulded or otherwise shaped as required, so that it is only necessary to review the additional equipment required.

Equipment for Blocks

In the first place, the room in which it is proposed to do the covering or moulding must be capable of being raised to and maintained at a fairly high temperature in winter. Provision then has to be made for melting chocolate couverture and also for cooling or "tempering" the melted mass to the correct temperature for use, the latter operation being critical and having a very important bearing on the success of the finished article. The appliances necessary for this may range from a simple "bain-marie" to a proper water-jacketed kettle heated by steam, gas or electricity as may be convenient. Up to this point the appliances will be the same whichever kind of block the maker has in mind.

Taking first the dipped block, of which a certain very well-known caramel and nut-filled block is an outstanding example with years of successful sales to its credit, the actual process of covering by hand is extremely simple and cheap. The centres are simply dipped in the tempered chocolate and placed on metal plaques or embossed tinfoil to cool prior to wrapping and packing. There are, however, several snags, some of which may not develop for some days, and large-scale production should not be attempted before it is established that all is well. For instance, the temperature of the couverture should be about 90° F., the exact figure depending on the particular blend and the presence or otherwise of cocoa-butter substitutes. The centres should be allowed to remain in the dipping-room until they are warmed through, otherwise cracks will appear in the covering in due course owing to contraction. Perfect covering must be aimed at or there may be difficulty with certain kinds of centres "weeping". Some soft fondant centres may also prove troublesome by expanding as inversion proceeds and bursting the couverture to allow the excess liquid to escape.

Cooling the Goods

If refrigerated cupboards are available they may be used for setting finished goods quickly, as this is of assistance in obtaining a good gloss, but they must be used with intelligence. Too rapid cooling may produce couverture cracks, and too low a temperature may cause difficulty owing to moisture condensing on the finished work on its return to normal temperatures. This moisture film may be practically invisible at the time and yet be present in sufficiently large amount to attack the sugar in the couverture, giving rise subsequently to the well-known sugar bloom which it is impossible to remove. A safe rule for the temperature for cooling cupboards is to keep the temperature 2 degrees or so above the prevailing dew-point, which is quite easily ascertained by the aid of an ordinary wet-and-dry bulb thermometer in conjunction with a dew-point chart. This can be done by any intelligent charge-hand, as no calculations are involved.

The centres that can be used for this method are numerous, ranging from fondants and toffees to biscuits,

and many novel combinations can be evolved, limited only by the ingenuity of the maker. Generally speaking, fairly strong flavourings should be used or they will not overcome the chocolate. Foiling and/or wrapping the finished product presents no difficulty even if done by hand, and neither does small inevitable variation in size.

Moulded Blocks

Production of the second, or moulded, type requires more in the way of equipment, but it permits of a greater variety of centres and also allows of assorted centres being incorporated in the same block. Taking the now popular 2d. block of about 2 oz. weight, it is possible to obtain moulds in banks of three or four, and, with a comparatively few of these quite a respectable output can be obtained even when the moulds have to be filled and emptied by hand. The actual process is simple. The moulds, suitably warmed, are filled with a scoopful of the tempered chocolate and coated all over by a circular movement. They are then inverted to drain over a tray mounted, if possible, on a vibrating table. When the excess couverture has been shaken out, the moulds are removed and the centres previously made to the correct shape are inserted. Conditions should be warm enough to keep the chocolate film in the moulds soft enough to accommodate itself to the centres, which should be lightly pressed down. The backs of the moulds are then filled up and levelled off, the necessary couverture being applied with a steel spatula. One sweep of the spatula is sufficient as experience is gained.

The next step is demoulding after slight cooling. An ordinary electric fan blowing through a rack carrying the moulds can sometimes be used for cooling. The actual demoulding is most readily done by tapping the mould lightly in an inverted position on a solid iron block or plate. Great attention should be paid to the cleanliness of the inside of the moulds and they should on no account be allowed to come into contact with the fingers, or dull patches and sticking will follow. Chocolate moulds should be polished with a clean rag occasionally, and if washed should be put into hot water to which a trace of soda has been added, after which they must be thoroughly rinsed in very hot water, dried at once and thoroughly repolished, as practically all water leaves enough deposit to spoil the high polish so desirable in the finished article.

Fillings

The question of appropriate fillings for blocks has purposely been left to the discretion or ingenuity of the maker, but a review of lines already on the market will reveal that soft caramel with or without nut, cracknel or biscuit find a ready sale, while such items as biscuits, turkish delight, fondant and fancy creams are all popular.

As mentioned previously, chocolate for covering should be fairly strong in flavour, and a recipe for a moderately cheap mixing is as follows: 38 lb. Accra cocoa mass from well-roasted beans, 48 lb. pulverised sugar, 7 lb. cocoa-butter, ½ lb. lecithin and ½ oz. vanillin crystals. Refine and conch 12 hours. If the mix is too thick add a small percentage of cocoa-butter.

For those who prefer to use a milk chocolate covering, the following is a cheap mixing, capable of improvement by the addition of extra milk powder if costs permit: 19 lb. Accra cocoa mass lightly roasted, 9 lb. full-cream milk powder, 58 lb. pulverised sugar, 15 lb. cocoa-butter, 2 oz. lecithin. Refine well and conch until the fatty odour is dispelled from the milk powder, this taking about 24 hours.

Purity of Canadian Maple Products

THE maple industry is one of considerable importance in Eastern Canada. The average annual value of Canadian maple products is about $4,000,000. A considerable proportion of the output is exported to the United States. Canadian maple sugars and syrups are conceded to have a decidedly pronounced flavour and are valued for blending purposes. Maple syrup and maple sugar are used to flavour a variety of foods, including bakers' products, baked beans, candies, dessert powders, flaked cereals, ham and bacon cures and ice-cream. Much of the exported product goes into tobacco manufacturing.

The flavour of maple has never been isolated. It seems to be due to a combination of several aromatic constituents. Maple sap itself has no flavour. The characteristic flavour appears only after concentration to syrup by heat. Various synthetic imitation flavours are on the market, but the true maple flavour has never been reproduced.

The importance of protecting the Canadian maple products industry is fully appreciated by the Dominion Department of Agriculture. Regulations governing the sale of maple products under the Maple Sugar Industry Act are administered by the Fruit Branch of the Department. Syrups must not contain more than 35 per cent. of water, sugars not more than 15 per cent. Four voluntary grades have been established for syrups and three for sugars, depending on colour and flavour. The highest grade products must be light and have a mild characteristic flavour. The word "maple" must not be used on other than pure maple products. The composition of products which resemble maple must be declared. Methods for the detection of adulteration have long occupied the attention of chemists, states J. T. Janson, Chemist, Experimental Farms Branch, Dominion Department of Agriculture.

Improvement of quality, concentration and isolation of flavour, and elimination of impurities are among the problems which have been studied by research workers in Government, university, and industrial laboratories. Since 1931 the Division of Chemistry, Central Experimental Farm, Ottawa, has been responsible for the chemical control of the industry. Several hundred samples of all kinds of maple and imitation maple products collected by inspectors of the Fruit Branch have been examined. This service protects both the producer and the consumer.

CONFECTIONERY

PROGRESS, as it applies to the origination of new plant for the use of confectioners, is more a process of gradual evolution than a matter of overnight growth. This is not difficult to understand. With only a few exceptions, the processes employed to-day are almost precisely the same as those which were in use thirty or even forty years ago, so that, apart from a loss of efficiency and a disproportionate cost, there is little difference between the products of modern machines and those of the last generation. There are only a limited number of raw materials which lend themselves to combination and there are no more than a certain number of ways in which such combination can be effected commercially. From time to time, at rather infrequent intervals, a new material is adopted by the manufacturing confectioner—but such additions are usually capable of being handled in already accepted ways. Occasionally, a totally new type of product is created—more often than not as the result of an accident either to recipe or process. Progress, then, is limited to improvements in existing methods and to the employment of plant capable of making better use of existing materials. One realises, on consideration, how much the modern confectioner owes to his engineer.

Mechanical Advances

During the last fifty years, while certain engineering concerns have specialised in, and in some instances concentrated on, the manufacture of plant for confectioners, there has been a steady march of progress from a mechanical standpoint. While the basic processes have remained the same, the plant available for the performance of these processes has become more and more efficient, of wider selection and of greater application. More consistent results, larger outputs, smaller power consumption, reduced labour costs—in short, greater efficiency—have been the increasing tendency.

Progress has been, and continues to be, made along several slightly different lines. While, as has been said, in most cases the resulting products differ but little from the goods produced by earlier types of machines, the confectioner obtains, by the application of contemporary plant, the maximum assistance to contend with existing economic conditions.

Wrapping Methods

The evolution of the caramel toffee trade—from an unimportant cheap side-line to a best seller with a demand and popularity rivalling that of chocolate—is an example of the creation of a distinct and new branch of the industry through the development of wrapping machinery. In pre-war days, toffee was only marketed in slabs, a form of presentation which did not lend itself to easy handling on the part of the retailers—and for which, in consequence, there was only a limited market and that on a low price level. Certain sweetmeats were wrapped as individual small units, but as such wrapping had to be performed manually or, at the best, by primitive, slow and relatively inefficient machines—in either event a slow and expensive operation—such lines were usually in the high price class. Semi-automatic wrapping machines were invented, wrapping was commercialised as some forty pieces per minute were enfolded in waxed paper with the aid of one operator. The rapid development of these machines followed. Speeds of 100 pieces per minute gave way to higher speeds, until to-day machines wrapping at the rate of 500 pieces per minute are the accepted standard.

A caramel-cutting and twist-wrapping machine made by Rose Brothers (Gainsborough), Ltd. Class R.A.F. 500.

The principle upon which this high speed wrapping has been based differs quite considerably from the original conception of machine wrapping. The earliest machines were constructed to reproduce, mechanically, the operations previously performed by a hand-wrapper's fingers. The processes of rolling out the toffee to a uniform thickness, cutting it into cubes or other suitable shapes and separating these pieces had all to be carried out before satisfactory material could be fed to the wrapping machine. Apart from the restrictions imposed by the operators' limitations in feeding the machine with cut pieces, the space required for cooling slabs, caramel

PLANT PROGRESS

C. D. Lovell, A.I.I.A.

brakes and cutting machines, tended to make large outputs impossible unless considerable floor space areas were available. In addition, despite the utmost care in operating the cutting machines, the losses on this process were a serious handicap to efficiency. A loss, in the form of misshapen pieces and off-cuts, between the yield of the boiling pans and the output of the cutting machines of some 18 per cent. being not unusual.

The modern machines are fed with a rope of still warm toffee, or caramel, either by hand or from a batch roller, pieces are cut off automatically by the machine, sized to shape and twist-wrapped in a tight and secure manner. Only limited slab room is necessary, sizing and cutting machines are unnecessary—their waste obviated—and the amount of labour required is reduced to a minimum. By the use of special metals, ball-bearing mountings for the principal shafts and oil baths for the chief drives, noise and vibration are almost completely eliminated and outputs of 500 pieces per minute are attained.

Effects of Mechanisation

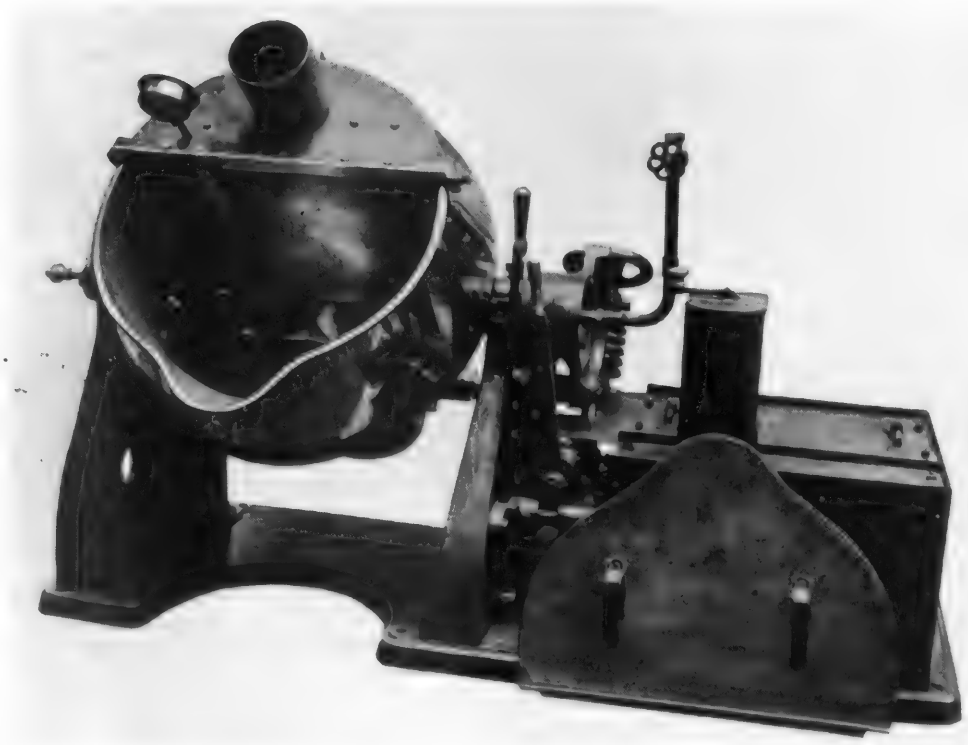
Such assistance from the engineering side of the trade has enabled confectioners to secure a market for good quality caramel toffees at prices which would have been unprofitable without such facilities. In addition to taking higher quality goods to a new market, making larger outputs possible to manufacturers whose trade outgrew their available facilities under previous conditions of production, this evolution has been the means of providing employment for large numbers of unskilled or semi-skilled workers. The introduction of plant has, in general and in so far as it is applied to the confectionery trade, created employment rather than the reverse. In this particular instance it has built up a branch of the industry which, at regular intervals, vies with some of the older branches—such as the chocolate trade—for the place of premier importance.

Generalising, one might consider that the confectioners' machinist has not played a very important part in the creation of either new lines or new processes. The reason for this has been outlined. The mechanisation of operations which have always been in existence, is an important function. Many lines, which could never have received national distribution, have been commercialised through the creation of labour-saving devices, automatic machines and plants which have either reduced labour costs to a minimum or increased outputs to a maximum. An example of this type of facility is provided by the growth of the packet trade, which has been dependent upon the provision of suitable machines.

Small packets or rolls of gums, lozenges, boiled sweets and similar confections can be packed by hand, but increasing wage rates and the genuine shortage of juvenile and female labour makes such methods uneconomic. A development during the past year is a machine for wrap-

[Courtesy, L. J. Claridge: Agent M.F.M. machines.

A new type of counting and wrapping machine for the production of packets of gums, tablets, boiled sweets, etc. An output of 70 packets per minute is achieved.



A heavy duty boiling and mixing pan — a machine with a wide field of application—embodying an under-drive.

Courtesy, Wm. Brierley, Collier and Hartley.

ping round and rectangular pieces, with an inner wrapper of waxpaper, transpaper, foil or waxpaper-backed foil, and an outer band label—the ends being either folded or twisted. It is merely necessary to keep the feed hopper supplied with material and any predetermined quantity of pieces (within limits) is collected together to be wrapped into packets, an automatic counting and feeding apparatus being an important part of the machine. One operator can produce up to 70 packets per minute with quite a small consumption of power and occupying very little space.

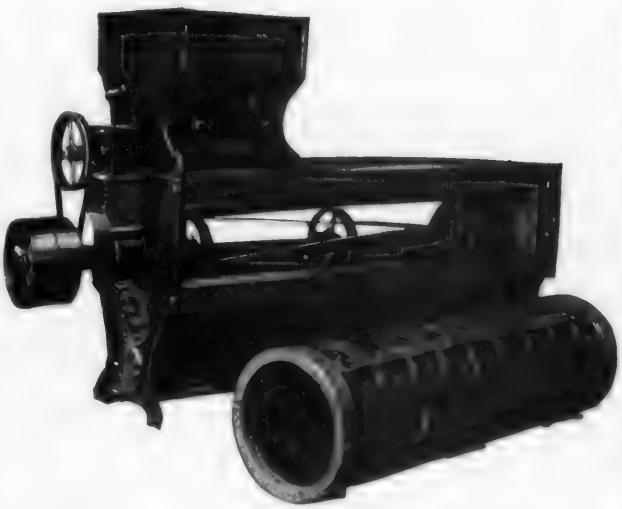
Boiling Processes

The most familiar process in the whole confectionery trade, the one which might almost be regarded as the keystone and for which there never has been, or can be, a substitute, is that of boiling. No matter what product the confectioner manufactures, he must, at one stage or another, use this process. Apart from the earliest commercial application of the open fire—the coke stove and its successor, the gas stove—for many years boiling has been achieved by the application of steam heating. For certain work the coke and gas stoves are still used and there have been a number of inventions through which the engineer has endeavoured to obtain the maximum efficiency from the heat applied. Vacuum boiling pans of various types, continuous cookers and so on, have all appeared in the process of evolution. There have been at least two new designs of boiling pans, in the creation of which the lessons derived from all previous practices have been applied. A thorough knowledge of the difficulties with which the practical confectioner has to contend, an understanding of the problems arising out of the maintenance of boiling pans which are called upon to stand up to constant and regular heavy duty, and an application of the latest engineering principles have all contributed to the designs. In passing it is of interest to note how two different designers have tackled the same problem and to compare their machines.

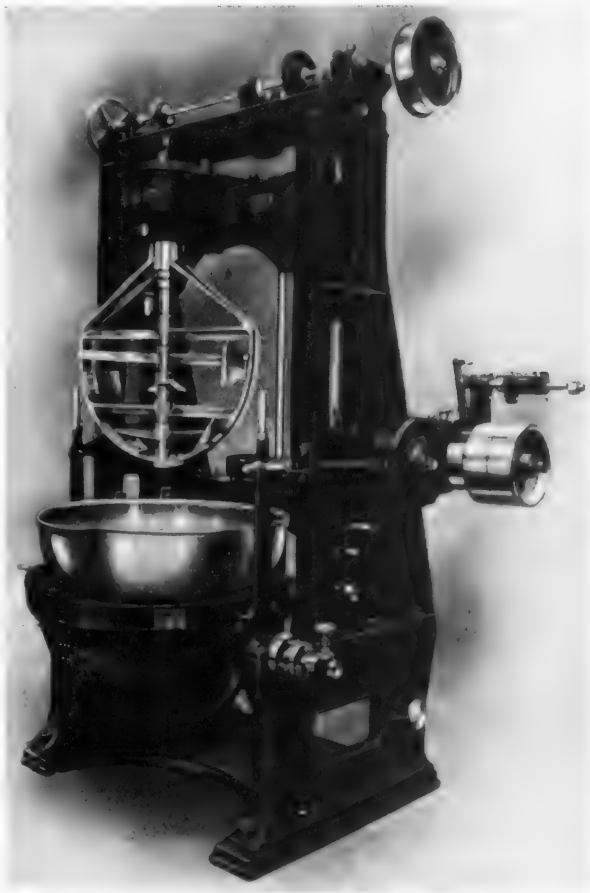
Stirring Devices

In the first machine the stirring device is driven from below the pan—an innovation which reduces the strain on the driving gear, which so frequently gave rise to breakdowns on the older and (possibly) more orthodox types of vertical mixing pans. This point may be of but minor interest to the practical sugar boiler and the technician, but it is an important one to the manufacturer who has to consider maintenance costs and who is interested in minimising the losses which occur when any machine is out of commission for repairs. By driving from below, the familiar bow-like stirrer is unnecessary (though it can be fitted if desired), as adequate agitation and complete mixing, as well as the removal of the batch from the pan sides, are achieved by a beater in the form illustrated. There are two considerable advantages in this. The movement, while thorough in its action, does not splash to anything like the same extent as the bow form of beater. The machine is, therefore, much cleaner in use and there is less waste. In addition, it is possible to arrange for a suitable thermometer to be so fixed to the pan that the bulb is in contact with the boiling batch —an aid which greatly assists consistent results.

Power losses, which are inevitable with belt drives, are



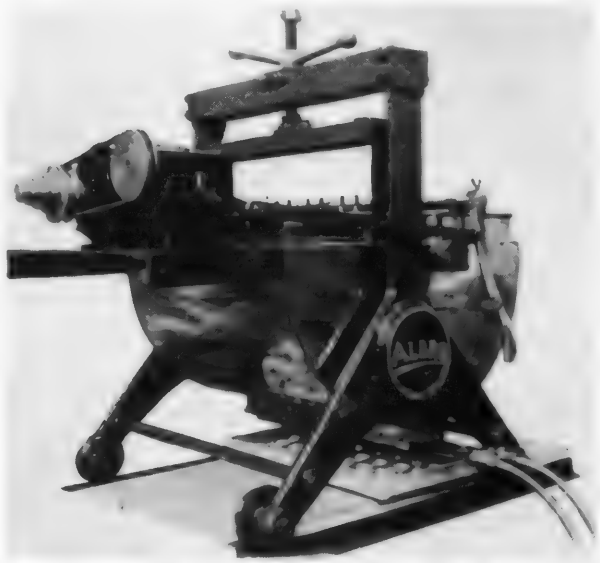
A patent quick change powder dresser, one of the selection of machines for the confectionery industry made by Wm. Gardner and Sons (Gloucester), Ltd.



A heavy duty mixing machine for sugar confectionery made by Robert Kellie and Son, Ltd., of Dundee.

minimised by the fitting of a direct coupled motor. A four-speed gear-box enables the mixer to operate with the utmost efficiency whatever consistency of batch is handled. Proper arrangement and the use of the most suitable speed for the work on hand reduces power consumption to a minimum, ensures the quickest boiling time and widens the field of application. The machine can be made equally suitable for the manufacture of goods which are liable to grain if agitated too severely, for the emulsification of caramel toffees during the boiling process and for the whipping-up of nougats. It is possible to minimise the wear and tear on the machine should it be necessary to incorporate heavy and hard lumps of waste cuttings or materials such as nuts or cokernut into the boilings. An automatic tilting device, which empties the contents either slowly or quickly as the operator may require, fitted with an automatic but controlled stopping point and with an automatic return device, is an interesting feature.

The alternative design, aimed at providing similar assistance to the confectioner, has provided double standards which reduce the overhang of the mixing bow to a minimum—the full torque being transmitted direct to the point where it is required, the ball-bearing mounted gears being immediately above the bow itself. The advantages of such sound and sensible construction are very obvious, and they are given maximum effect by the provision of a three-speed interlocking gear-box drive together with automatic lifting and lowering mechanism to the stirring bow. One particularly interesting point is that the designer, having decided to provide a genuine "heavy duty" mixer, arranged the main features of the framework and the operating mechanism so that batches considerably larger than the usual factory practice could be handled with ease and satisfaction. This has set a new standard of output and boiling labour cost.



A multiple valve depositing filler made by Albro Fillers and Engineering Co., Ltd. This range is usually made with 6 to 12 valves and is suitable for handling thick, heavy emulsions in a hot condition. The containers are usually placed upon a bench in trays preparatory to the machine passing over them.

Above is shown a solid centre chocolate bar moulding machine for the production of moulded chocolate containing hard cream or caramel centres. Also is shown a cooling conveyor. This machine is made by Norman Bartleet, Ltd.

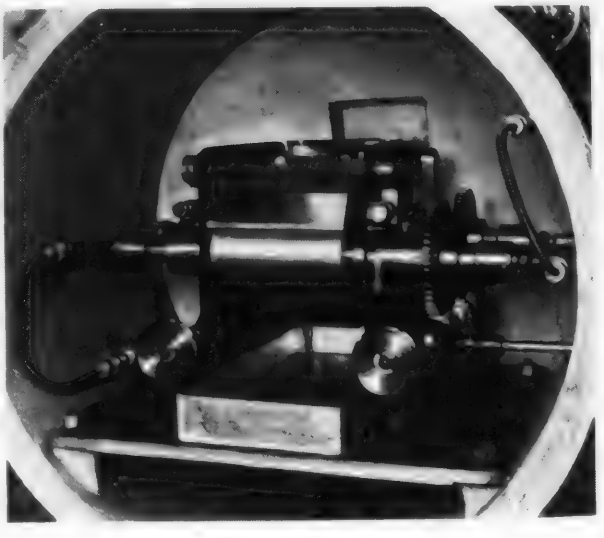
On the right is a chocolate-mould washer built specially for the "floor level" handling of the article it washes. This particular model is installed at the works of Terry's Chocolates at York. The makers are Dawson Bros., Ltd.

Records of Work

Records of a normal day's work on one of these pans —not under test conditions—hitherto unpublished, may prove of interest:

Number of working hours ..	8½
Working steam pressure ..	130 lb. per sq. in.
Weight of batch	370 lb.
Weight of added cuttings ..	30 ,,
Average total batch yield ..	400 ,,
Average pan loading time ..	4 min.
Average pan emptying time	4½ ,,
Average batch boiling time	24 ,,
Total number of batches ..	15
Gross output for period ..	6,000 lb.

Such are two typical examples of development in the confectionery trade. Manufacturers are harassed by labour shortages, by increasing costs of wages, by increases in the prices of raw materials and, probably the most important factor of all, by competition from other industries seeking to secure an increasing share of the money which the public are prepared to spend on luxuries. Present economic conditions can only be met by mass production methods, by the avoidance of all wastage of time, material, labour and power. The confectionery manufacturers who are alive to the situation are accepting all the possible assistance which they can derive from the use of up-to-date plant. In return, the engineers continue to carry on the trend of evolution with the primary idea, "How can existing processes be more efficiently and more economically performed?"



An experimental small scale film drum dryer for the manufacture of chocolate. Made by L. A. Mitchell, Ltd.

FOOD AND CALORIE REQUIREMENTS OF HARVEST LABOURERS

THE following is an extract from the Report of the Széchenyi Scientific Society of Budapest, 1937:

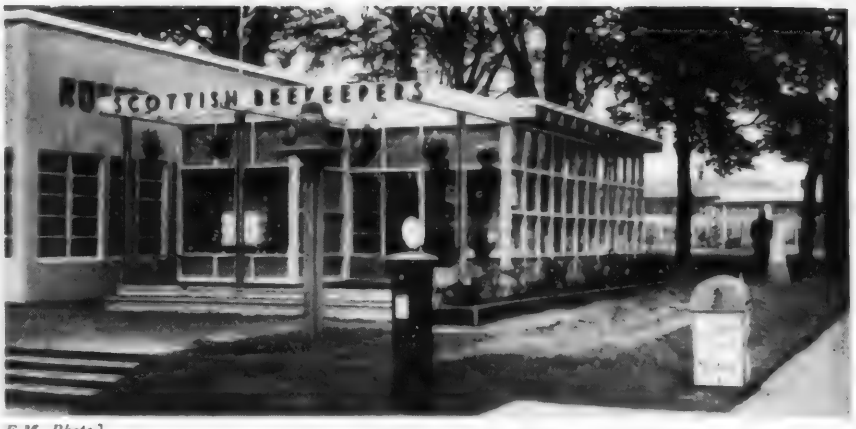
The late University professor Dr. Géza Farkas worked for several years in the Physiological Institute of Budapest University upon the *metabolism and energy-expenditure of Hungarian field labourers in harvest-time.* No investigation with this object in view had ever before been made, either in Hungary or elsewhere. Professor Farkas examined the nature of the gas exchanges of respiration during different hours of the harvest, and ascertained the daily hours of work and their distribution among the different activities, and the average labour performed; this was in order to calculate from these data the daily expenditure of energy. It was sought to check and supplement the values calculated from experimental data; this was done by fixing the composition of the labourer's food, reckoning its value in calories, and observing what calory content sufficed to prevent loss of weight during work; in this case the number of food calories is equal to the energy transformed by and during work. This latter may thus also be ascertained. Knowledge can moreover be obtained of the alimentary circumstances of the harvest labourers, variation of their body-weight during the harvest, the nature of their usual food, whether this is adequate, and how it is utilised. The experiments were made on the State stud-farm at Mezöhegyes, but Professor Farkas was also able, during the long years of experiment, to pursue his studies in other parts of the country, calculating, on the basis of his observations, the average value of the metabolism. Great difficulties were encountered. The assistants had to find out the division of the working time before the harvest began, and to live for weeks among the labourers. The transport of the experimental apparatus, its setting up, and the care of it so far from the laboratory of the Institute, caused further difficulties. The labourers mistrusted the experimenters, and objected to the uncomfortable respiration tests; and it was still more difficult to get them to collect excreta with the necessary exactitude. Neither was it possible to exercise any compulsion; the people had to be persuaded into co-operation. The first part of the research dealt with the respiratory exchanges during different kinds of harvest labour, such as mowing, binding, laying shocks, walking to the field. The oxygen intake during these labours was ascertained, and the heat production reckoned on that basis. The intake was largest with the mowers, and larger with wheat than with oats. When wheat was being mown, the intake of oxygen varied between 1,800 and 2,500 c.c. per minute. The intake was of course also affected by the nature of the crop (standing, lying, dense or thin) and by the nature of the ground (level or sloping, wet or dry). The increase of heat production after mowing 10 square metres was found to be 4·4 kg. calories, which corresponds very closely with the value of 3·9 kg. calories obtained in Professor Farkas's former experiments. The mowing of oats is much easier than that of wheat; the intake of oxygen during the former labour increases from 1,400 to 2,300 c.c. per minute. Binding and laying are easier than mowing. During the laying of one shock the intake of oxygen was 1,500 to 2,100 c.c., the increase of heat production 15·7 kg. calories (former experiments 15·8 kg. calories); while in binding sheaves the oxygen intake was 1,800 to 2,300 c.c.; heat production rose by 0·94 kg. calorie while one sheaf was bound. Walking over stubble is more tiring than on plain soil; the oxygen intake doubles. At Mezöhegyes one group consisted of wage labourers, the other had a share of the crop. The former worked 13, the latter nearly 15 hours a day, for it was to their interest to have the harvest over quicker and to get on to other work on the domain. About three-fourths of the time was spent mowing, the rest in other labour. In that time a labourer on share mowed about 4,000 square metres of land daily, a wage labourer only 3,300. The work done and the data obtained show the labourer's daily transformation of energy. The daily heat production of one harvest labourer rises to at least 4,600; 4,700 kg. calories is about the excess due to work. In any case this is the lower limit of metabolism, as the lower values were always used for calculation. The contents of protein, fat and carbohydrates of the labourer's food were determined, and the energy content of one day's food found to be 4,700 to 4,900 kg. calories. This was insufficient, for the labourers' weight diminished (2 kg. per day on an average) during 10 days' harvest work. This loss could be stopped by giving food with more calories in it. The observation also shows that harvest workers expend more energy than 5,000 kg. calories. Both feeding experiments and studies of respiration prove that the energy expenditure in such circumstances is very great. The results of Professor Farkas's later researches correspond with those he made in 1927, when considerable loss of bodily weight was determined, which could be prevented by better feeding. The transformation of energy in other work was not so great as that observed in harvest labour. Remembering also that this labour goes on for weeks, 12 to 14 hours a day, we must count it among the hardest kinds of work done by man.

Soviet Food Industry in First Quarter of 1938

ACCORDING to figures published in a recent issue of *Izvestia*, the food industries under the control of the People's Commissariat of the Food Industry of the U.S.S.R. during the first quarter of 1938 have turned out products to the value of 3,085,220,000 roubles (in stable prices of 1926-27), exceeding the plan of the first quarter of the year by 6·6 per cent., and the output of the corresponding quarter of 1937 by 17·5 per cent. The enterprises of All-Union importance produced goods to the value of 2,027,560,000 roubles, exceeding the plan for the first quarter of 1938 by 9·1 per cent. and the output of the corresponding quarter of 1937 by 21·2 per cent. The industries of local importance turned out products to the value of 1,057,660,000 roubles, exceeding the plan for the first quarter of 1938 by 2·2 per cent. and the first quarter of 1937 by 10·8 per cent.

THE INDUSTRY AT THE EXHIBITION

A recent report on the Food exhibits at the British Empire Exhibition



F.M. Photo.]

The Scottish Beekeepers' Pavilion—an attractive exhibit.

FOOD IS the greatest link that binds the British Empire together, and so rightly enough it occupies a prominent place in the Empire Exhibition at Bellahouston Park, Glasgow.

The prime exhibits in the Food Section are staged by the various Dominions and Colonies. These have been so arranged as to provide a complete picture of the agricultural possibilities of each country. The Canadian Pavilion, appropriately enough the largest in the Dominions Avenue, is decorated with paintings illustrating various aspects of Canadian life and enterprise, and has over thirty firms exhibiting. The increased importance of canned foods throughout the world is reflected in the various exhibits in this class, and, according to our information, the canning of foods is an ever-increasing industry in Canada. This increase is stated to be due in great measure to the ready market these products find in the British Isles.

A display of the agricultural products of Canada, arranged by the Department of Agriculture, covers tobacco, flax, cereals and various finished foods. Attractiveness is also added by the bacon, cheese and other dairy produce, with a typical Canadian note in the maple syrup and maple sugar. Passive showmanship is not allowed to tell the whole tale, as it is possible for visitors to sample most of the foods displayed.

The decorative scheme of the Canadian Pavilion is followed in some measure in the Australian Pavilion, where paintings of typical Australian life are displayed. An enormous relief map of the Commonwealth indicates natural features and sources of supply of the exports of the Commonwealth. Needless to say, the sections devoted to food products are considerable. The collection of cereals in the agricultural section is a wide one and includes tropical and sub-tropical products of Queensland. An interesting feature is a refrigerated showcase in which butter, eggs and cheese are exhibited. A duplicate of this showcase contains fresh meat.

Canning is on the "up-grade" in Australia, and the canned meats and by-products attract the attention of many visitors. Fruits, fresh and canned, occupy over 300 sq. ft. in this pavilion, and assistants are most active in disposing of samples of these goods. Although there are no samples being given away in the wine section, the unfamiliar nature of some of these drinks should attract the palates of many people in this country, particularly when the preferential duty allowing these wines to be sold at a low rate is taken into consideration. The Australian Pavilion authorities have hit upon an ingenious way of disposing of the samples of the various products, as these are sold in a full-scale grocer's shop. Needless to say, this does a great trade.

As the world's largest exporter of dairy produce, New Zealand's Pavilion naturally devotes much space to food. Here again refrigerated and glass-fronted cabinets are used to good effect to display butter, cheese and meat. On one of the stands the sample people were doing a great trade, particularly with the New Zealand fruits, and it was possible to see visitors hung around with bags filled with produce from the various Dominions. Food canning is here again on the increase and among the delicacies so offered were oysters, toheroa soup and other New Zealand delicacies.

Agricultural progress of the Union of South Africa is shown in a diorama and the actual displays of food were not on the large scale used in the other Pavilions. On the other hand, wine takes a prominent place, the central feature of the wine exhibit being a wine fountain surrounded by examples of South African vintages.

As might be expected, a great deal of attention was centred on the Irish Government's whisky exhibit, and a working model showing the whole process of pot still whisky manufacture was on show. The fact that potatoes play a great part in the manufacture of Irish whisky was new to many of the visitors.

Tea drinkers are catered for in the Empire Tea Pavilion, which is part of an intensive campaign on the part of the Empire Tea Market Expansion Bureau. Every possible method of "getting across" the importance of tea drinking is employed both by offering samples of tea and showing numerous illustrations of the present prosperous state of the tea industry. One of the most attractive of these illustrations shows the race of the famous tea clippers *Taeping* and *Ariel*.

In an adjoining cinema, sound films are shown depicting life in India and Ceylon, with particular emphasis on the production of tea. Visitors can be seen sampling finest Empire tea in the congenial surroundings provided.

W. L. H.

Plants, Fungi and Fish are three causes of FOOD POISONING

described by

Elliot B. Dewberry, M.R.I.P.H., M.R.San.I.

IT HAS long been known that certain plants, when consumed, are poisonous to human beings. In recent times, however, poisoning of this kind usually has been accidental, the particular plant being gathered and eaten in ignorance of its nature, or in a mistake for some harmless variety. The majority of cases occur among children, who are especially liable to eat the leaves and berries of poisonous plants, including seeds of the peach and bitter almonds. The number of such plants in this country is comparatively few. Some are rare, others are only noxious at certain periods of the year. In a few instances parts of the plants only are poisonous.

The most common are the following: Cowbane or Water Hemlock (*Cicuta virosa*); Water Dropwort (*Œnanthe crocata*); Monkshood or Aconite (*Aconitum napellus*); Deadly Nightshade or Dwale (*Atropa belladonna*); Henbane (*Hyoscyamus niger*); Foxglove (*Digitalis purpurea*); Hemlock (*Conium maculatum*); Black Hellebore (*Helleborus niger*); Bittersweet or Woody Nightshade (*Solanum dulcamara*); Fool's Parsley (*Æthusa cynapium*); White Bryony (*Bryonia dioica*); and Laburnum (*Cytisus laburnum*).

Cowbane or Water Hemlock (*Cicuta virosa*).

These plants contain poisonous substances or alkaloids, the chief being strychnine, atropine, coniine, aconitine, hyoscyamine, scopolamine, solanine and cytisine.

Cowbane, which grows at the edges of ponds and ditches and is one of the most noxious of plants, is common in temperate climates. The leaves are not unlike those of parsley and the seeds resemble anise. All parts of the plant are poisonous and have a mouse-like odour. The stem is stout-furrowed, hollow and branched. The tapering root, which is short, fleshy and hollow, is often mistaken for wild parsley, celery or horse-radish, with fatal results.

Poisoning by Cowbane

Many instances are on record incriminating this particular plant. In 1901, a party of boys were camping out on an island in the Firth of Clyde and 24 of them were poisoned by eating water hemlock. Cowbane is allied to the famous and deadly poisonous hemlock of the ancients, a decoction of which history relates was administered to the Greek philosopher Socrates.

Another member of the hemlock family is the **Water Dropwort.** This grows in ditches and other damp situations. All parts of the plant are poisonous, especially the fleshy root stock. Johnson and Sowerby (1861) recorded the poisoning of 17 convicts who gathered and ate the weed, mistaking it for celery and parsnips; 9 suffered from convulsions and 6 died.

Monkshood or **Aconite.** The poisonous nature of this plant, which is common in river valleys in South Wales and Yorkshire, was well known to the ancients. It is not, however, usually found outside the cultivated garden. The root is conical or spindle-shaped, which should distinguish it from the cylindrical pungent root of the horse-radish, with which it is often confounded, thus resulting in many cases of poisoning.

Deadly Nightshade (Belladonna), sometimes called Bane Wort, grows in lime soils and on the North and South Downs and the Cotswolds. It is poisonous to man but, like many other plants, there are seasonal variations. A little before flowering, the root, which is the most noxious part of the plant, is richer in the poisonous principle than after flowering. The cultivated plant is less poisonous than the wild variety. The large

ripe berries resemble blackberries and are especially attractive to innocent children. A curious case of poisoning by belladonna leaves is recorded by Savage in 1921. Three persons after partaking of roast stuffed mutton became ill ten minutes after consuming the food. Considerable amounts of atropine were isolated from the "sage" stuffing. The outbreak was traced to the use of dried herbs which had become accidentally mixed with the belladonna leaves owing to both growing together.

Rhubarb has frequently been the cause of oxalic acid poisoning, both at home and abroad. During the food scarcity in the Great War the use of the leaves was recommended as a substitute for green vegetables. The recommendation was, however, soon withdrawn as a number of deaths resulted from poisoning. In 1917 a warning was issued against using soda when cooking rhubarb.

Poisoning by the ingestion of bread made from wheat contaminated by the seeds of certain weeds occurred in South Africa; it was known as "bread poisoning". The suggestion was that the seeds found their way into the wheat when the threshing machines and mills were not fitted with efficient winnowing and sieving apparatus. In most cases the weed was identified as Senecio, commonly known as **Ragwort,** of which there are several species. Ragwort is a scheduled noxious weed in this country, and its destruction may be made compulsory under an order of the County Agricultural Committee.

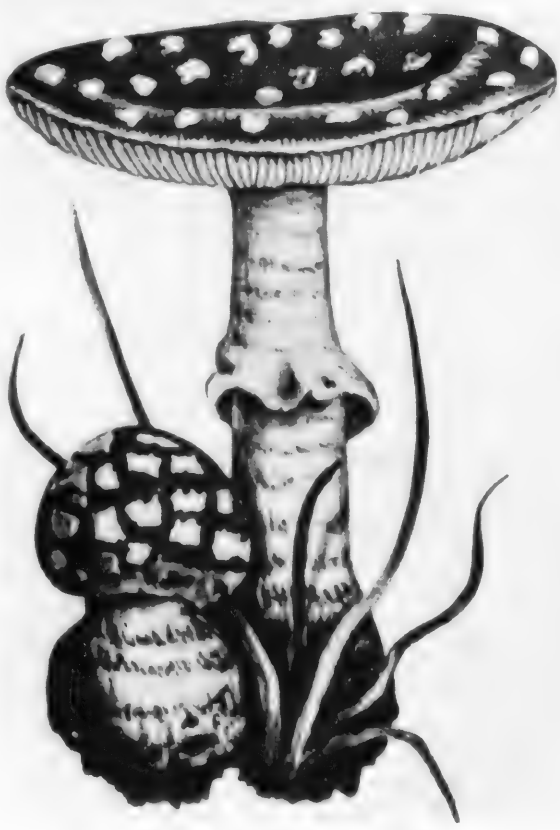
Verdigris Agaric.

POISONOUS FUNGI

From the earliest times we find records that man regarded fungi as a possible source of food. History relates that the eating of fungi was a popular custom amongst the ancient civilised peoples. The Greeks and Romans at their feasts and banquets indulged in the consumption of many different varieties, the Boleti being in special favour, truffles coming next in esteem. One of the earliest attempts to classify fungi was made by the Greek physician Dioscorides Pedanius, who divided them into edible and poisonous forms; there are numerous references in classical writings to the ways of distinguishing these two groups.

Edible fungi now constitute an important article of diet both in this country and abroad. The field mushroom (*Psalliota campestris*) and the commercially cultivated variety are at times in considerable demand, both for edible purposes and for canning. The food value of the fungus is small. The cultivation of the mushroom began in France, as described by Tournefort, in 1707. At the present time immense quantities of edible fungi of several varieties are grown near Paris in underground caves some miles in length.

The study of edible and poisonous fungi has been pursued by various workers. It is recorded that the first systematic investigation was carried out in 1791 by Bulliard, a French mycologist; he gave the name of "destroying angel" to *Amanita verna*. French scientists have done much for the study of poisonous fungi.



Fly Agaric (*Amanita muscaria*).

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Works on Mushrooms

In this country many books and monographs have been written from time to time on the subject. In 1832, James

The common edible mushroom (*Psalliota campestris*).

[*Courtesy, Herbert Mount.*

The commercial growing of the common edible mushroom (*Psalliota campestris*) on a large scale.

Sowerby, Junr., compiled an illustrated work on mushrooms and champignons, and in 1894 Cook published his book on *Edible and Poisonous Mushrooms*, in which he mentions 22 species of the poisonous variety.

In 1910 the Board of Agriculture issued a small illustrated handbook on *Edible and Poisonous Fungi*. This excellent work, of which several editions have since been published by the Ministry of Agriculture and Fisheries, now contains 24 coloured plates and a detailed description of each fungus. Contrary to general belief, the number and kinds of fungi in this country which have really poisonous properties are comparatively few.

During the summer and autumn (mushroom season) cases of poisoning frequently occur as a result of persons confusing the edible with the poisonous fungi. The degree and severity of the resulting illness is in proportion to the quantity of ingested poison, as the poisonous properties of fungi are chemical in nature and vary in potency in the different species. Idiosyncrasy of the individual also plays an important part in fungi poisoning. Even the ordinary field mushroom disagrees with some persons and may cause intestinal disturbance, especially if not fresh or badly cooked.

Food Poisoning in War

During the Great War, when there was a shortage of foodstuffs in Germany and Austria, the incidence of fungi poisoning greatly increased. In 1916, Roch recorded numerous outbreaks of poisoning in the districts around Geneva. In 1921, owing to the increasing number of cases and deaths in France due to the consumption of fungi, an elaborate publicity campaign was started. The Pasteur Institute exhibited different species of edible and poisonous fungi and made known the precautionary and other measures to be adopted to combat this type of food poisoning. In some countries a law has been passed regulating the sale of all fungi, and those to be retailed for consumption are subjected to an official inspection. In America, where "mushroom poisoning" has been fairly common, the whole subject has been carefully investigated by several workers, including Ford, Abel, Bronson, Patterson, Charles, McIlvaine and Schlesinger, and, as a result, much useful information concerning the poisonous properties of some of the fungi has been accumulated. Ford, 1909-11-23, compiled a valuable historical survey and divided the poisonous fungi into groups:

Groups of Poisonous Fungi

(*a*) Those causing gastro-intestinal disturbances but rarely with fatal results. Species concerned: ***Boletus satanas, Lactarius torminosus, Russola emetica, Entomoma sinuatum***, etc.

(*b*) Those producing degenerative changes in the internal organs and tissues, together with violent pain, delirium and coma, with high mortality. Species concerned: ***Amanita phalloides, A. virosa, A. verna, Pholiota autumnalis***, etc.

(*c*) Those in which the poisons act on the nerve centres causing delirium, hallucinations, convulsions, but seldom terminating fatally. There are many mild cases of this

type. Species concerned: *Amanita muscaria*, *A. pantherina*, *A. aspera*, etc.

There is no general infallible method of distinguishing edible from poisonous fungi, and there are several varieties or closely allied species in this country which are edible and wholesome. The only safe procedure is to learn to identify certain well-recognised species by their botanical features, as the field mushroom, or the horse mushroom, and to avoid fungi growing under trees or in woods, as it is very easy to make mistakes with the numerous varieties, some of which sport bright colours and are very poisonous. Even in the case of those known and correctly identified caution must be exercised. It is essential that the fungi eaten should be fresh and be free from attacks by insects or other organisms causing decomposition. Mushrooms are indigestible when eaten raw and unwholesome when decomposed.

The distinguishing features of the common field mushroom (*Psalliota campestris*) are as follows: Grows usually in short grass in open pastures, uplands or downs, in summer and autumn. In the young or "button" stage it is whitish and nearly round. Later the cap expands and becomes hemispherical and nearly flat. The mature cap is white or brownish-white in colour, skin dry, silky and smooth and peels easily and cleanly. Stem white and solid but slightly pithy, enlarged below and requires a twisting movement to break it off. Membranous ring round the middle or towards the top. No sheath near top or at base. Flesh is white, thick and soft, colour changing to reddish or dirty brown when broken or cut. Gills thin and crowded and not joined to stem. Colour whitish in "button" stage, but becoming pink and finally purplish-brown to black. Odour earthy but not disagreeable. Taste somewhat earthy but pleasant.

Among the chief poisonous varieties of fungi found in this country are the Death Cap or Cup, or Deadly Amanita (*Amanita phalloides*); the Fly Agaric or Scarlet Fly Cap (*Amanita muscaria*); the Yellow Staining Mushroom (*Psalliota xanthoderma*); the Warted Agaric (*Amanita pantherina*) and the Verdigris Agaric (*Stropharia æruginosa*). Of the above species the Death Cap and the Fly Agaric are the most frequent cause of poisoning. The Death Cap is said to be the cause of 90 per cent. of the deaths caused by fungus poisoning. Ford (1909) calculated that 12 to 15 deaths occurred annually in the United States of America from this species alone. It has been estimated that in Germany it causes 80 to 90 deaths every year. Very small quantities of the fungus cause intense suffering. It acts firstly as a digestive irritant and after an incubation period of 6 to 15 hours there are recurrent violent pains, with vomiting, thirst and choleraic diarrhœa. Secondly, it acts as a protoplasmic poison, causing degeneration of the cells in the liver and nervous system, followed by coma and death.

The Death Cap grows in woods and the adjoining pastures. The cap is greenish or yellowish-olive in colour streaked with dark fibres, or is occasionally white; it is sticky when moist. The stem is whitish and sometimes tinged with green, with a loose silky ring towards the upper part. The base is bulbous and sheathed by a large, yellowish-white cup which is more or less buried in the soil. The gills are white with a slight greenish tinge.

Ministry of Agriculture and Fisheries. Oyster Purification Tanks, Brightlingsea, Essex.

Flesh white but greenish under the outer skin. When old the fungus has a fœtid odour.

Nature of Mushroom Poisons

The poisonous properties of the *A. phalloides* were investigated by Kobert in 1891. He extracted a poison which he named "phallin"; this acts upon the red corpuscles of the blood, dissolving out the red colouring matter. In 1906 Ford confirmed this, and also isolated a heat-resisting toxin which he called "ananito-toxin". He considered it to be the principal poison in this fungus and which produced the lesions in animals and man.

The Fly Agaric, which grows under birches and conifers and in woods containing these trees, is very poisonous, causing severe illness and sometimes death. The name is derived from the fact that a decoction of the fresh fungus was formerly used as a fly poison. The fungus contains the alkaloidal substance "muscarin". Patterson and

Charles suggested there were probably other poisons present, as atropine, which was a perfect antidote for muscarin, did not entirely neutralise the effect of injections or decoctions of this species of fungus. Savage says, "Although muscarin is a powerful poison, the symptoms it produces in the human subject are not identical with those produced by this type of mushroom poisoning (*Amanita muscaria*); while, therefore, it is reasonable to assume that muscarin plays a large part in the toxicity of this mushroom it is probably associated with other poisonous bodies which have not yet been isolated and studied".

The poisonous symptoms come on almost immediately after consumption of the fungus. There is excessive sweating, salivation, giddiness and difficulty in breathing. In severe cases there is nervous and mental disturbance, followed by convulsions.

The Fly Agaric can hardly be mistaken for the ordinary field mushroom as it is a brilliantly coloured, decorative species. The expanded flat and sticky cap is of a scarlet or orange-red colour and covered with thick, irregular, whitish worts, the fragments of the sheath at the base of the stem. The stem, which is white or yellowish in colour, is 4 to 7 inches high. The base is bulbous and encircled by several concentric rings. The gills are white or pinkish-white, crowded and thick and free from the stem. Flesh white but yellowish under the outer skin. It has an unpleasant, sickly odour and a nauseous bitter taste.

POISONOUS FISH

Although this type of food poisoning is not very common in this country, there are nevertheless many kinds of fish, more especially those found in tropical waters, which, if eaten, even when in an apparently healthy condition, sometimes produce symptoms of poisoning. These effects are more likely to occur if certain parts of the fish are consumed, such as the liver, roe, head or intestines.

Ministry of Agriculture and Fisheries. Mussel Purification—Hosing the Mussels.

Symptoms of Fish Poisoning

The symptoms of fish poisoning are usually of two kinds: (*a*) Gastro-intestinal irritation with rapid prostration and sometimes urticaria, (*b*) severe nervous symptoms and convulsions.

In some fish a poisonous substance appears to be secreted at certain times of the year: for instance the pike, sturgeon, carp, bream and the turbot, whose roe produces violent intestinal disturbance if eaten during the breeding season. Jordan remarks: "The season of the year at which the fish is taken is undoubtedly a factor of importance, and there is evidence connecting the presence of toxic constituents with the state of the reproductive organs". Fish roe poisoning is common in Russia and causes severe gastro-enteritis.

The initial products of decomposing fish are extremely toxic and attack the nerve centres, producing a type of illness somewhat resembling botulism. The poison is undestroyed by salting, although the putrefying bacteria are killed, and will produce severe poisoning if the salted fish is insufficiently cooked before it is consumed.

Certain varieties of fish are perfectly harmless if eaten as soon as they are caught, but become toxic if allowed to remain uncooked even for an hour. Of the fish ordinarily consumed in this country, mackerel has the worst reputation for occasionally causing illness, possibly due to the rapidity of decomposition; there is little doubt that it should be eaten as soon as possible after being caught. Some persons have a peculiar idiosyncrasy to mackerel, and even herrings, and become ill after eating them, even though they are in a fresh condition.

Signs of Decomposition

The usual signs of commencing decomposition are as follows: When *rigor mortis* has passed off the eyes are sunken and of a grey colour; gills greyish or muddy-white, later becoming greenish and slimy; flesh along backbone shows a reddish discoloration and is easily stripped from the bone; wall of abdomen soft or pulpy, sometimes showing a jelly-like appearance with discoloration; the fish has a tainted or even putrid odour. Rigidity and stiffness are sure guides for fresh fish.

In recent years most of the commercially important species of white fish have been kept experimentally in cold store at temperatures ranging from $-5°$ to $-30°$ C. for periods up to 6 months (Reay, G. A., Reports of the Food Investigation Board for the Years 1929-35). As a result of the tests it has been recommended that for periods up to 6 months the freshly caught fish be rapidly frozen, glazed and stored at temperatures ranging from $-20°$ to $-30°$ C. Fish treated in this manner remain in good condition, are highly palatable and, moreover, suitable for smoke curing.

Among the fish in tropical waters which are well known to be poisonous are the different varieties of wrasse, the parrot fishes, so named from their brilliant colouring, the toad fishes, the file fishes, and the family of tetrodontidæ

(globe, puffer or balloon fishes), comprising many important species such as the "fuga" of Japan, which causes so many deaths among the Japanese. This family is widely distributed along the coasts of Japan, China, East Indies and Africa.

Shell Fish

Some people show a definite idiosyncrasy to shell fish generally, even when eaten in season, and urticaria and gastro-intestinal symptoms usually follow their consumption. Apart from outbreaks of typhoid fever, due to infected shell fish collected from beds polluted by sewage, cases of food poisoning have from time to time been reported due to the consumption of contaminated oysters, mussels, cockles, etc. At Avonmouth, in September, 1936, an outbreak of acute gastro-enteritis affecting some 18 persons and due to eating cockles purchased from an itinerant vendor and associated with *B. Proteus vulgaris*, was recorded by Alan Gray.

Mussels

Mussels are particularly liable to be toxic. Dutertre came to the conclusion that no class of mussel is always poisonous and that the poisonous action is not due to food eaten by the mussel, decomposition, spawn, or any particular portion of the mussel itself, but that the poison is due to a true disease attacking the liver.

Dodgson,* in his report on mussel purification, 1928, states: "The widely held view that all manifestations of poisoning, due to the consumption of mussels, arise from a common cause inherent in mussels is erroneous. Certain popular conceptions that poisonous properties reside in the 'beard', foot or other particular parts of the mussel are erroneous".

Meyer, in recording an outbreak of mussel poisoning in California in 1927, where 102 persons were affected and 6 died, remarks that poisonous mussels cannot be distinguished from sound molluscs, either by appearance or behaviour on cooking; occasionally a pungent odour may be noticed; the liver is always large and dark.

Dodgson says: "Mussel poisoning includes at least three distinct pathological conditions, namely:

(*a*) 'Musselling' or the erythematous form, which is due to properties inherent in the mussels, and this affects a limited number of specially susceptible people, who should avoid mussels. The symptoms are of short duration and unpleasant while they last, but are never of serious import.

(*b*) Paralytic form, always grave and even fatal. Its cause is not definitely known, but it is always due to mussels from foul or stagnant waters. It is extremely rare. The danger of contracting it may be reduced to such small proportions as to be probably entirely negligible if elementary caution be exercised.

(*c*) The bacterial food poisoning form. There are, recorded in the literature, several cases of fatal poisoning following the consumption of mussels which were, in all probability, instances of bacterial food poisoning. The cases in question are difficult to classify, either because the information available is inadequate for the purpose or because certain of the symptoms were such that it is not possible to exclude the paralytic form."

With regard to (*b*) Paralytic form, the classical mussel-poisoning outbreaks at Wilhelmshaven in 1885 (19 cases with 4 deaths) and Dublin, 1890 (7 cases with 5 deaths), well illustrate this type of poisoning. The typical symptoms were vomiting, swelling of the face, constriction in throat, numbness of mouth and lips, pricking and burning sensation in hands and feet, want of co-ordination of movements, giddiness, spasms and dilation of the pupils of the eyes, death resulting from respiratory paralysis.

In the Wilhelmshaven outbreak, Brieger isolated a substance he called "Mytilotoxine" from the mussels, which when injected into animals produced all the symptoms of mussel poisoning.

In the California outbreak the mussels were not located in stagnant or polluted basins, but were subjected to the ebb and flow of the tides.

The Prevention of Shell Fish Poisoning

Owing to the successful experiments carried out in connection with the purification of mussels at the Fisheries Experiment Station (Ministry of Agriculture and Fisheries), Conway, North Wales, under the direction of Dr. Dodgson, the process on a commercial basis has now been going on for over twenty years. Oysters are also subjected to similar treatment on a commercial scale at Brightlingsea in Essex.

The system of purification is based on the natural action of the bi-valves clearing their alimentary canals freely in sterilised sea water and thus becoming gradually cleansed. They not only get rid of the sewage and the bacteria, but also all particles of solid matter. Bacteriological examination has demonstrated that the bi-valves are freed from possible contamination and fit for human consumption. Thus the problem of safeguarding the public health from infection from these particular shell fish is practically solved. It should be specially noted that the shell fish thus purified are not impaired either in keeping quality or any other respect.

With regard to lobsters and crabs, these tend to decompose quickly. The indication of a good and fresh condition in the lobster is a clear, hard shell, with flesh plump and firm. After being cooked, the tail on being pulled out should spring back sharply. Boiled crabs do not keep well in hot weather. This is shown by the discoloration of the apron, from which an indescribable odour issues. The parts beneath the claws also become sticky and wet. If the shell appears faded in appearance it is an indication of staleness.

The shells of a healthy oyster should be tightly closed; if open they should immediately close on being handled, otherwise the bi-valve is dead and unfit for food. Oysters should be eaten immediately on being opened.

The various Acts and Regulations relating to shell fish are as follows:

Public Health (Regulation as to Food) Act, 1907.
Public Health (Shell Fish) Regulations, 1934.
Public Health (Cleansing of Shell Fish) Act, 1932.
Oyster, Crab and Lobster Act, 1877.

* Report on Mussel Purification, by R.W. Dodgson, M.D. (Lond.), M.R.C.S. (Eng.). Ministry of Agriculture and Fisheries, Fishery Investigation, Series II, Vol. No. 1, 1928.

PUBLIC HEALTH —— *and the Food Manufacturer*

A REPRESENTATIVE gathering of chemists and executives of the food industry attended the discussion on the "Food Manufacturer's Contribution to Public Health", which comprised Section F in Hygiene of Food (in conjunction with the Food Group of the Society of Chemical Industry), at Portsmouth on Thursday, July 14.

The joint paper by E. H. Callow, B.Sc., Ph.D., F.I.C., and T. Moran, D.Sc., Ph.D., of the Low Temperature Research Station, Cambridge, on the Handling of Carcases presented some of the latest researches on the hygiene of the live animal and the hygiene of the environment to which the resultant meat is subjected. Dr. Callow, apologising for the absence of his colleague, Dr. Moran, read the paper, which made some very interesting references to the matter of fatigue of animals and its repercussion upon their curing properties, especially with reference to pigs.

He also referred to *post-mortem* factors, and his reference to figures obtained in slaughterhouses was very suggestive. To those who are in any way familiar with slaughterhouses, it will be interesting to know that one-tenth of an ounce of dung was found to contain 20,000,000 organisms, whilst one-tenth of an ounce of soil contained 200,000 organisms per square inch.

The essence of the authors' thesis was that whatever palliatives in the direction of ozone, carbon dioxide, ultra-violet rays, freezing, etc., might be applied, these did not eliminate the necessity for the most meticulous attention to the irreducible precautions to be taken both with the live animal and its flesh after it is dead.

J. W. Black, B.Sc., A.I.C., Chief Chemist, Excel Co., Ltd., followed with a paper which epitomised hygienic precautions in the meat canning factories, and his dictum that "the whole factory, not the retort house alone, is the preserving house", is one which may well be taken as a slogan by meat canners.

B. G. McLellan, F.I.C., M.I.Chem.E., Chief Chemist, Rowntree and Co., Ltd., covered the hygienic measures adopted by sugar confectionery manufacturers, and stressed the advantage to the manufacturer of keeping in close touch with the suppliers of their raw materials, and that only in this way could a perfect control be exercised.

Theodore Rendle enlivened his paper on Fruit and Vegetable Canning by the exhibition of the actual products the handling of which he was discussing. Very striking was the way he poured out a tin of very badly stained broad beans, and another tin of the same vegetable of immaculate greenness. This desirable result was obtained by selective breeding of a variety which would give the desired result. He also handed round a basket of strawberries of an amazingly deep colour, which was also the result of selective breeding.

Dr. Hughes, President of the Food Group of the Society of Chemical Industry, presided, and covered the aims of the discussion in an ably terse manner in the course of his Presidential Address.

Discussion followed the various papers, and not only did the questions and comments from the technical members of the meeting demonstrate the interest that had been aroused by the papers, but great appreciation was shown by various laymen.

A vote of thanks to the President and to the readers of the papers was proposed by Mr. R. P. Page and seconded by Mr. F. W. T. Arnaud, and a suitable response by Dr. Hughes terminated the session.

The Scene at the Presidential Address.

Dr. Clayton

William Clayton, D.Sc., F.I.C.

DR. WILLIAM CLAYTON, who has for eleven years been head of the laboratories of the Crosse and Blackwell combine, is to join the Metal Box Company as personal assistant to Mr. Robert Barlow, Managing Director, in September, with particular reference to technical development.

Dr. Clayton was educated at the Oulton School, Liverpool, and the University of Liverpool, and holds the degrees of B.Sc. (first-class hons. Chemistry), 1914; M.Sc., 1915; D.Sc., 1921; and F.I.C., 1922.

Dr. Clayton began his career with the English Margarine Works, Ltd., Liverpool, and later worked for Calder's Margarine Works, Ltd., Liverpool, High Speed Steel Alloys, Ltd., Widnes, and Salt Union, Ltd., Liverpool, whom he joined in 1920 and left in July, 1927, to become chief chemist with Crosse and Blackwell.

On leaving Crosse and Blackwell for a short holiday, prior to taking up his new post, Dr. Clayton received a series of handsome gifts from the laboratory staff and the works staffs. He was entertained to a luncheon at the Waldorf Hotel by Sir Frederick Eley, Bt., Chairman, and a number of the directors of Crosse and Blackwell.

He has recently been nominated to receive the medal awarded annually to a distinguished ex-student by the University of Liverpool Chemical Society.

Among the writings of Dr. Clayton figure *Margarine* (1920), *The Theory of Emulsions and Their Technical Treatment* (1935), *Colloid Aspects of Food Chemistry and Technology* (1932).

He has contributed to Alexander's *Colloid Chemistry* (New York), Liesegang's *Kolloidchemische Technologie* (Dresden), Hefter-Schönfeld's *Chemie und Technologie der Fette und Fetteprodukte* (Vienna), British Association *Colloid Reports*, Annual Reports of the Chemical Society (Colloid Chemistry), Harvey's *Technical Aspects of Emulsions* (London), *Chemistry in the Twentieth Century* (Wembley Exhibition Volume, 1924).

He has written many original papers on emulsions, dairy chemistry, colloid chemistry and bacteriology.

His patents include continuous production of margarine, prevention of fat bloom in chocolate, spray-dried protein products (avoiding changes due to denaturation), jam boiling (continuous process), rapid-setting junket powders, electro-lacquering of fabricated cans, can-lining compounds, bacterial flavouring of salad dressings, salt for curing hides, spray-dried silicates and chill-proof olive oil.

Service for Bakers

THERE are three principal reasons for cheese cake falling after it is baked:

1. The *p*H of cheese not right; the cheese having an acidity represented by the *p*H value of 4·27 is the most ideally suited for cheese cake. When the acidity becomes greater, then the cake has a tendency to be dry and will crack on top, and fall when removed from the oven.

2. Not enough moisture in the mixture, due to cheese being too dry.

3. Baking temperature being too high. 300° to 325° is generally the best temperature.

Here is a formula for French Cheese Cake:

Line cheese cake rings or moulds with the following dough, and bake half done:

- 8 oz. sugar.
- 6 oz. butter.
- 1 lb. cake flour.
- 2 eggs.
- ½ teaspoonful baking powder.
- 2 tablespoonfuls water.

Then make a cheese mixture of:

- 1 lb. pot cheese.
- 4 oz. 4X sugar.
- 4 oz. gran. sugar.
- 4 oz. butter.
- 1 quart milk.
- 1 pt. egg whites.
- 12 egg yolks.
- 4 oz. bread flour.
- 2 oz. cornstarch.
- Juice of 1 lemon and grating.

Boil the milk and butter together; rub the pot cheese in a separate bowl with flour and starch, until smooth. Then add 4X sugar and mix again. Add the egg yolks, two at a time, then, while beating, pour the boiling milk and butter slowly over the cheese until the milk has been beaten in. Add the lemon juice and grating. Beat up the egg whites with granulated sugar. Fold the two mixtures together. Pour the cheese mixture into the mould. Bake the cheese mixture in a very slow oven, 325° F.; baking time approximately 1½ hours. When baked, let cool off entirely in the mould.

The above were taken from an Information Sheet issued by the Bakery Engineers Information Service of Chicago. Both were given by members of the Society.

NEWS FROM THE INDUSTRY

Confectionery Show

A schedule of competitions to be held in connection with the Confectioners', Bakers' and Allied Traders' Forty-Second International Exhibition and Market, which is being held from September 3 to 9 at the Royal Agricultural Hall, London, N. 1, has been received. The date for late entries is August 26, 1938, ordinary entries closing on August 17. As conditions may vary from year to year, it is recommended that competitors should carefully read the current schedule. All entries should be made to: H. S. Rogers, 11, Queen Victoria Street, London, E.C. 4.

* * *

Americans Want Smaller Baking Pans

The two-day conference of representatives from all over the U.S.A., together with representatives of the pan size committee of the American Bakers' Association, which was held recently at Indiana, adopted the following recommendations regarding the reduction of the size of baking pans. They agreed that a general reduction in pan sizes would: (*a*) Improve bread quality materially; (*b*) increase the consumption of farm and bakery products; (*c*) benefit the consumer.

To illustrate their contentions they gave the following example: "Take 23 oz. of dough which is commonly used for a 20-oz. baked loaf; in this case multiply 23 oz. by the factor 2·4 to get 55·2 square inches, which should constitute the maximum area of the top dimensions of any pan to be used. This pan could then be a 12½ in. by 4½ in. or an 11¾ in. by 4¾ in. or a 7⅛ in. by 7 in. twin pan or an 8½ in. by 6½ in. twin pan."

They also agreed on intensive educational work throughout the country to secure a reduction of pan sizes.

* * *

British Industries Fair

The Department of Overseas Trade say that there is great probability that the demand for space will again be in excess of the area available—in fact, in the case of one section of the Fair, it is already becoming necessary to discontinue the acceptances of applications for space. The Department lay stress upon the necessity to make immediate application for space should manufacturers desire to participate in the 1939 Fair.

Applications for space may be obtained at the Department of Overseas Trade, 35, Old Queen Street, London, S.W. 1.

Making Meat Tender

The proteolytic enzymes occurring in the leaves, milk, fruit, trunk and seeds of the paw-paw (*Carica Papaya*) have for many years attracted the attention of food manufacturers in various parts of the world.

For centuries the natives of certain tropical regions have made their meat tender by wrapping it up in the leaves of the plant. Recently, an extract, claimed to contain the active principle, has been put on the market in the form of a liquid called "Tendrin".

The method of using this is to brush the surface of the meat with the liquid, and let it remain 15 to 30 minutes in contact with it, prior to cooking. It is claimed that meat treated in this way will be more quickly cooked, and that a saving of from 20 to 50 per cent. cooking time is achieved.

It is also said that by the use of this product, the least expensive cuts of meat will be rendered as tender and have a flavour as good as the most expensive ones. The suppliers of "Tendrin" are the Tendrin Company, City House, 158, City Road, London, E.C. 1.

* * *

Sanitary Inspectors to discuss Shellfish

Sir Leonard Hill, the eminent scientist and president of the Sanitary Inspectors' Association, will preside at the association's fifty-first annual conference to be held at Edinburgh from September 5 to 10. A subject of peculiar interest to be discussed this year is "Shellfish". Particular attention no doubt will be given to efficient methods of cleansing to obviate all possibility of shellfish poisoning. Other subjects range from the inspection of meat, control of milk supplies, and food and drugs legislation, to housing, sanitation, atmospheric pollution, and the disposal of trade effluents.

* * *

New Stock List

Manufacturers of marzipan, peels and fondant icings, James Fleming and Co., Ltd., have recently issued a new Stock List. This is admirably illustrated with colour pictures of the firm's various products. Two good features are an index and two pages of very helpful recipes dealing with confections.

Copies are available free of charge.

Food at the Foire

The display in the Foodstuff Section at the Thirtieth Foire de Paris was more extensive and attractive than ever this year. There was a very apparent increase in the number of those picturesque pavilions erected by individual firms. This note of originality was quickly appreciated by visitors who never fail to express their wholehearted admiration of this particular quarter of the Fair. It is, of course, one of the open-air sections—a corner that is temporarily transformed into a miniature village with a charm that lies in the diversity and individuality of its "shops". Nowhere else is it possible to find such a wonderful collection of foodstuffs. Every delicacy for which the Continent is famed may be seen and sampled there.

Machinery and material used in food manufacture, together with its packing and presentation, formed another important group of exhibits remarkable for their ingenuity and efficiency. Affairs were particularly active here. An interesting innovation in this section was the stand organised by the National Society of French Railways, the purpose of which was to demonstrate the means by which damage to goods (resulting from insufficient or unsuitable packing) could be avoided. A wide range of products was included in this display, from eggs and flowers to cookers and electrical machinery.

* * *

National Dairy Show

Since the National Dairy and Ice-Cream Exhibition was started in 1931, each year has seen a bigger and brighter show. This year will be no exception. The exhibition will be staged at Olympia, in both the Grand and National Halls, from October 11 to 14. It is a show both for the public and all engaged in the dairy industry from production to distribution. The cattle section is again being organised by Mr. E. S. W. Dale, secretary of the Royal Counties Agricultural Society, and Mr. S. A. Legg will be again responsible for the Poultry Section.

The show has received the support of the 7,000 dairymen of the National Dairymen's Association. The ice-cream section will be controlled by the Ice-Cream Association, and it is expected that the National Milk Publicity Council will stage a comprehensive display of particular interest to women, as they did last year.

New competitions will be added to those that have proved so popular

in the past—Butter-making, Clotted Cream, Ice-Cream, and Window Dressing. Among the new ones already decided upon are a Soft Cheese competition and one for the dispensers of milk-bar products.

The organisers have given considerable thought to providing increased travelling facilities from all parts of the country and, by the co-operation of the railway companies, a scheme of special excursion trains is now under consideration.

* * *

Factory Finding

The problem of moving to a new factory is a complicated one for the manufacturer. Finding a suitable site where transport and labour supplies are adequate is in itself likely to be a difficult and lengthy business.

Commercial Structures, Ltd., offer a unique service which relieves the manufacturer of these worries and saves him a great deal of time and money.

They are able to provide sites in any of the industrial zones in and around London: sites that have been carefully selected where transport facilities are good and labour supply abundant. They then analyse the particular requirements of the industry which is to be rehoused and erect a scientifically planned factory which may be rented or bought freehold. Being themselves responsible for the entire project, including the preparation of plans, supply, fabrication and erection of steelwork and reinforced concrete work, the installation of heating, lighting and all services, the minimum of delay is ensured and the exact cost is ascertainable in advance. Many years' research and a vast practical experience of modern industrial building construction enable them to carry out this work with remarkable speed and economy. They have, during the past five years, erected more than 250 factories.

* * *

A Century of Control

For a concern to reach a centenary is an achievement, but it becomes unique when, as in the case of George Kent, Ltd., the founder and his son, the present managing director, have between them controlled the business for the whole 100 years. This firm, known throughout the food industry as engineers who specialise in control instruments, reached their centenary last June. A really beautiful "volume of reminiscences and pictures in commemoration of the firm's centenary" takes us throughout those whole 100 years. The achievements and expansions accomplished within that century are indeed astonishing. This book is an admirable summing up.

This is Mr. Robert Barlow, Managing Director of the Metal Box Co., Ltd. His company's annual general meeting held recently was the occasion for a warm tribute to be paid him by the Chairman, who said that the Balance Sheet showed how successful had been his hard work on behalf of the company. In reply Mr. Barlow said that the results could not have been achieved without the support of an enthusiastic and loyal staff. The progressive policy of the Metal Box Co., Ltd., and the work of their Research Department, who pay particular attention to the preservation of food as a reserve in emergency, were referred to at the meeting.

* * *

New Fruit Industry in Ulster

"During the past three years the annual import of fresh apples into the United Kingdom has averaged nearly seven million hundredweights, valued at six and a half million pounds, while another six millions a year is spent on dried and pulped fruit. That gives some idea of the dimension of the market I see for our products," said Mr. A. Hunter, founder of one of the first of the new industries established in Belfast under the New Industries' Development Act. Mr. Hunter recently told the Ulster Development Council of his new process for preparing home-grown apples for the bakery trade and food industry generally, which absorbs a great and growing quantity of the fruit. In the food industry, he said, speed and ease in the handling of materials are nowadays as essential as in any other, and to have fruit fillings ready, in bulk, for immediate use is a valuable saving of time and labour to the manufacturer.

Within the past year Mr. Hunter has turned an idea into a business, which, though already active, is only at the beginning of its possibilities. Asked by a member of the Council to relate the story of his new venture, Mr. Hunter said, that as a baker he had done a good deal of lecturing and demonstrating in many parts of Ulster. Knowing the enormous demand of the trade for apple fillings, he had been dismayed at the loss caused by the wastage of apples in Ulster, which include the Bramley, the finest cooking apple in the world. Year after year, home-grown apples go to waste by the ton while thousands of pounds worth are imported from abroad.

"Such a situation is wrong on the face of it and I tried to find a solution to the problem it presented.

"I started with the idea of canning, but the very quality of the Bramley makes this process unsuitable as discoloration is liable to be caused by the acid in the fruit. Of course, for bakery use the apple must be perfect in appearance."

After many attempts, said Mr. Hunter, he succeeded in finding a means of producing fresh apples as an ingredient ready for use on a large scale. From the start of his operations he has had no difficulty in disposing of the whole of his increasing output. Nevertheless, his firm is continuing to experiment with a wider range of production, especially fruit compotes, in which gooseberries, rhubarb and other fruit is combined with an apple base to make a variety of fresh fruit fillings.

"One thing I want to emphasise", added Mr. Hunter, "is that the expansion of this new industry will be not merely of commercial importance—over a period of years its value as a source of additional revenue to fruit growers could hardly be overestimated in view of the trade figures I have already mentioned. Ulster growers in particular should benefit, since the soil here is perfect for the sort of cooking apple required, and I am one of those who believe that the best sort of development for Ulster is that which is based on her own natural resources."

Production at the factory is speedy. Apples come in contained in tubs of 400 lbs. and are rapidly cored, peeled and thoroughly cleaned, so that only unblemished fruit is passed for consumption. Within a few minutes they are washed, drained and cooked, yielding a clear apple, perfect in colour and not too pulpy in texture, as well as two valuable by-products in the form of apple purée and clear apple jelly.

A final touch of attractiveness is provided by the bright label on each of the new plywood kegs in which the apple is marketed. These labels tell the world that here are "guaranteed fresh Ulster apples, cut, sliced and ready for use, the product of Northern Ireland orchards".

Milk Condensing Plant

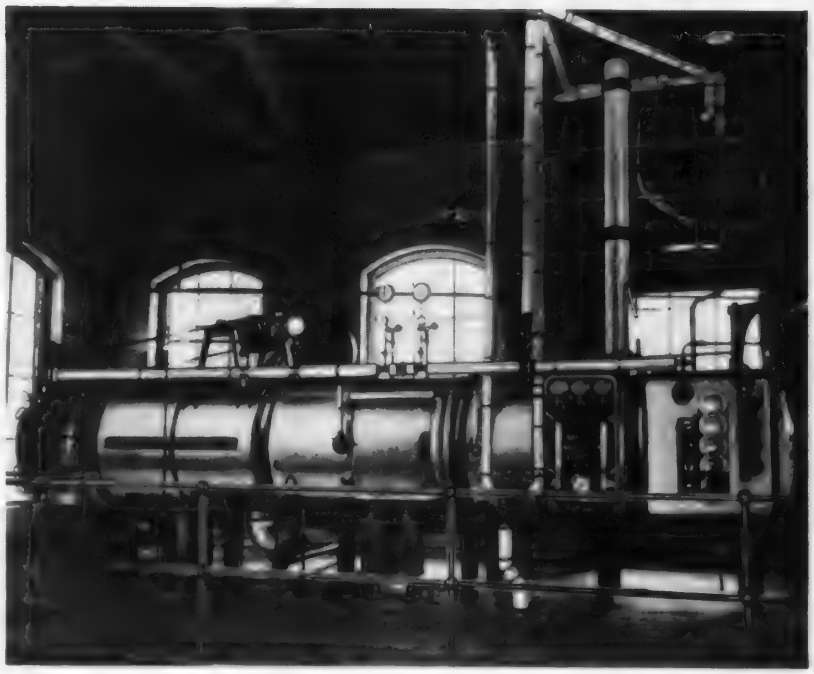
Of particular interest to the confectionery and sugar trades is the "Scott" patent forced circulation milk condensing plant. This unit is currently employed for the manufacture of sweetened and unsweetened condensed milk. Unsweetened condensed milk is usually processed on continuous lines.

The unit is particularly interesting due to the fact that it is possible to carry the concentration to a much higher point than is usual when manufacturing ordinary sweetened condensed milk, and in fact the concentration may be taken up to the point at which this material is usually discharged for drying and further processing. The milk is kept in positive and continual movement throughout the concentration, and the risk of overheating is, therefore, very considerably reduced.

Construction of these units is carried out in all metals such as stainless steel, tinned copper, etc., according to requirements.

Another machine of considerable interest is the "Scott" patent vacuum band dryer, which is used for the drying of cocoa mixtures and for the various special malt-milk-egg, etc., compounds which are prepared for beverages. A typical unit of this description installed in place is shown in the illustration.

This machine is made in a number of sizes and is used particularly for the drying of various chocolate mixtures which hitherto have been processed almost exclusively in vacuum stoves or drying ovens. The machine has the particular advantage of working in a continuous fashion, thus eliminating the heavy charge for labour necessary for the loading and unloading of the stove dryers. The material to be dried is fed into the machine in a continuous fashion on to a number of slowly moving specially woven wire bands and is discharged from each band in the form of a cake which is broken up and dropped into hoppers and discharged periodically from the machine.



During its travel down the dryer the material may be subjected to any variations of temperature conditions which may be required as the heating units are arranged in batteries. At the same time the speed of travel may also be varied so that the particular conditions of drying may be precisely adjusted for every variation in the composition of the batch. The dryer works under a comparatively high vacuum, which may be maintained by various types of vacuum pump.

The machine is also very largely employed for the manufacture of dried malt extract and the various combinations of malt extract with eggs, milk, cocoa, whey, etc., as currently used for incorporation in breakfast foods, etc.

These machines are manufactured by George Scott and Son (London), Ltd., Artillery House, Artillery Row, S.W. 1.

* * *

Milk Chocolate Manufacture

A raw material for milk or cream chocolate manufacture is "Miloko", made by Fredk. Boehm, Ltd. Guaranteed to contain the finest ingredients, and to have a distinct flavour of real milk, all that is necessary is to place the "Miloko" and extra nib (added according to taste) in the Melanger or other suitable mill, grind them down to a powder fine enough for the refiner and refine. During refining add a little cocoa-butter and then conche in the usual way, adding the rest of the cocoa-butter according to process. The product will keep for years if well stored in the sealed delivery bags.

* * *

Design Note

The printing of chocolate boxes is a speciality of Norbury Printers, Ltd., who have produced many designs for well-known manufacturers.

Ingenuity in Confectionery Display

A sample confectionery jar sent us by E. Duncan Doring is an excellent idea for display. It is a simple arrangement whereby a waxed board is introduced into the jar at the front, leaving a cavity $\frac{3}{4}$ in. wide between the glass front and the board. Into this a display of the confectionery is packed, thus making it a separate compartment from the rest of the jar. The jar still looks full from the front even after the rest of the confectionery is gone. In short, a display is continually shown. The "Slotted Convex" jar is patented and is one of few that have thus been allocated protection lately.

* * *

From Griffin and Tatlock, Ltd., comes a new balance damper for the food chemist. It is adaptable to a great majority of analytical balances, converting them instantly into damped balances. Known as the "Microid", it costs 50s.

Mr. Therm in Glasgow

A brightly coloured booklet from the British Commercial Gas Association telling of the gas exhibits at the Empire Exhibition makes a fine piece of propaganda for gas. In it we learn many absorbing details—70 gas meters installed with gas consumptions ranging from 40 to 6,000 cubic feet per hour, four miles of gas piping and so on. The booklet is also a good guide to the Exhibition, and has in it an easy plan for a quick tour of the gas exhibits in the Exhibition; it is both up to date and ingenious.

* * *

Glass and Confectionery

The various branches of the food industry interlock extensively so that we find the chocolate maker depending upon the milk producer to provide at least one ingredient for his confections. Enamelled Metal Products Corporation (1933), Ltd.,

contend, therefore, that their glass-lined tanks, in which milk is transported, do in some measure assist the confectioner; for what, they ask, could be cleaner than glass? A striking catalogue, FP-15, tells much more about Pfaudler equipment in the food industry.

* * *

Filling to Capacity

Often a vexing question with food manufacturers is how to get much in little. In short, how to get full capacity from a container by filling it as much as possible. A method of compressing the product, so leaving no air pockets to occupy space, is evidently necessary. The machine which does this job consists of a table which vibrates and shakes the product so that a very high degree of compression is obtained.

Machines such as these are made by the Sinex Engineering Co., Ltd. A brochure of theirs reveals that in the compressing or compaction of cocoa powder a 25 per cent. increase in capacity was achieved.

The Sinex Engineering Co., Ltd., can adapt their tables to all types of materials, and, further, the same type of vibrator in different sizes—*i.e.*, small, medium or large—is extensively used for the discharging of hoppers, etc., sieving and screening, being adaptable to practically any kind of machine. A feature of their service is a free trial of any machine by suitable arrangement.

* * *

Ball-Bearing Castors

As swivel castors are so widely used by food manufacturers, the patent design of the "Revvo" castor will be of interest to readers.

The ball-races are arranged so that the steel balls themselves prevent the fork separating from the top-plate. In this way, the centre rivet or bolt which has always proved a weak point in castors, is eliminated and almost frictionless operation is obtained.

"Revvo" castors are marketed in a wide range of sizes with iron or rubber-tyred wheels. Full information may be obtained from the Revvo Castor Co., Ltd., Archdale Works, Blechynden Street, London, W. 11.

* * *

Chocolate coating machines, the "Keenok Covral" series are made by the Keenok Co., Ltd. First made over 20 years ago, the "Covral" machines have one, the 24-in. type, which handles slow-speed production for good-quality chocolate as well as high-speed for the cheaper qualities. Full particulars are available from the company.

Humour Sells Staybrite

It is good to see humour creeping into trade and industrial advertising. Although it may be argued that "there's a time and place for everything", humour does help to oil the wheels of life and assists the smooth running of business. With these reflections one cannot help praising the new "Staybrite" booklet from Firth-Vickers. On every other page there is an excellent picture of a stainless steel finished product with a suitable description. As you flick over the pages, pictures depicting everything from cutlery to castings in stainless steel appear. On the other pages there is a humorous cartoon showing an amusing situation where someone says "Do you know" and then proceeds from the idea pointed by the picture to a summary of Staybrite's many uses. Cleverer still, in view of the headline, is the series of cartoons which occupy the second half of the book. "Stop talking about Staybrite", exhorts one of the characters in the pictures to his fellow, who evidently can find nothing else to talk about. A further summary of Staybrite's usefulness follows. As the advertising agent would say, here is an example of successful advertising with a negative appeal.

Humorous or not, when you have finished reading this booklet, as the cartoons will assuredly coax you to do, you will know quite a bit about Staybrite. And that is all the very best advertising can do!

* * *

Compressed Containers

The note in our last issue under the above heading in which it was stated that British United Products were makers of a range of compressed paper and other containers for the food industry was likely to create a wrong impression. Actually these containers, which are suitable for jams, mustard, powders, potted meats, juices, etc., are specially made for British United Products for distribution throughout the United Kingdom and most of the overseas countries.

* * *

A reprint of an article by F. Wellman, V.D.I., entitled "Operating Experiences with the Van Tongeren Dust Collector", has been sent by the Buell Combustion Co., Ltd. Comprising a dozen pages, the reprint is extremely well documented; it is available from the company.

* * *

From the Butterley Co., Ltd., makers of steel factory flooring, comes a new and most interesting leaflet dealing with modern applications in the food industry.

Automatic Pie-Making

A machine which makes it possible to deposit in pie cases a correct amount of meat without handling is the "Zenith" Automatic Scaling-Off machine of the C. O. Ericsson Engineering Works, Ltd. This concern specialises in pie-making machinery and issues a comprehensive set of descriptive leaflets.

* * *

Efficiency

A tea-packing plant at the factory of J. Lyons and Co., Ltd., uses interesting weighing machines. These weighers fit right over the bag-making and packing machines and thus enable a high degree of efficiency to be reached.

Another instance of food manufacturing efficiency is the installation of packing machines with the feed hoppers directly above at the flour packing warehouse of W. Melhuish, Ltd. The makers of these weighing and packing machines are Southall and Smith, Ltd., who number among their machine users many famous food manufacturers.

* * *

High Vacuum

Often it is necessary to have a low boiling point in the processing of heat-sensitive products, such as some foodstuffs, to improve appearance, preserve flavour and quality. This is the claim put forward in a booklet issued by the F. J. Stokes Machine Co., dealing with their high vacuum pumps. Well illustrated, with much solid information, this booklet is available from Stokes' British representatives, W. Edwards and Co., of Vaughan Road, Loughborough Junction, S.E. 5.

* * *

Marshmallow Machine

A marshmallow mixer is made by the Morton Machine Co. The big machine is of 100 gallons capacity (a smaller holds 50 gallons) and can be arranged for heating and cooling. It is used principally to manufacture heavy marshmallow. Already, we are informed, Cadbury and Fry use these machines.

* * *

A lavishly produced booklet from Crompton Parkinson, Ltd., tells a lot about Parkinson A.C. Motors. An idea of huge production capacity is conveyed by this publication. Indeed, the production figure of one motor every four minutes given inside confirms this opinion.

Book Reviews

Discoloration and Corrosion in Canned Cream

Practical recommendations which should lead to eradicating discoloration and corrosion in canned cream are put forward in a recent publication of the International Tin Research and Development Council. The work was undertaken by C. J. Jackson and G. R. Howat of the Hannah Dairy Research Institute, and T. P. Hoar of the International Tin Research and Development Council.

The defects studied in this work are the occurrence of purpling, bronzing, and pitting of the can and black particles in the cream, and an explanation of them is now provided. The practical implications of this and a previous paper on the same subject relate to the quality of the milk used for cream manufacture, the quality of the tinplate used for the cans, the kind and amount of stabiliser used, and the conditions of processing and storage.

The details are given in Technical Publications Series A, Nos. 49 and 72, of the International Tin Research and Development Council.

Copies of the above publications may be obtained free of charge from the International Tin Research and Development Council, Manfield House, 378, Strand, London, W.C. 2.

Patents, Designs and Trade Marks

Clear and concisely written books on difficult subjects are always welcomed, and this work, while not the only one on the subject of patents, trade marks and designs, comes into that category which, sacrificing no accuracy, remains comprehensible to the average business man. The need for this book cannot better be summed up than in the words of its author, "The average manufacturer or trader who never thinks it worth while, or never has occasion to obtain patents or registrations, is apt to think in consequence that they are no concern of his, but he is liable to receive a sad awakening when one day he finds himself faced with a charge of infringing someone else's patent, design or trade mark registration. It is the general desire amongst most business men to keep clear of the law, which is one of the reasons often given for not obtaining patents or registrations, but unfortunately occasions arise when lack of knowledge of the rights and powers conferred on others by patents and registrations is responsible for forcing the defence of a legal action upon one who has every desire to keep clear of the law. It is therefore vital for a knowledge of patents, designs and trade marks to be possessed, not only by those who make use of them, but also by those engaged in manufacturing or trading businesses.

"The main purpose of this book, therefore, is to explain in a manner intelligible to the ordinary business man the nature of patents, and of design and trade mark registrations, their value in business, and the way in which practical use should be made of them."

L. J.

Patents, Designs and Trade Marks. By Charles S. Parsons, B.Sc. Pp. 184. London. 1938. 10s. 6d.

Correspondence

The Editor.

SIR,

I was very much struck by E. Hammond Foot's letter on the "Yeoman" movement in your April issue. It would seem to me to be just the kind of movement that is needed to put our country on a firm footing for the future. I trust it will receive the support of all the food manufacturers who read your paper, who will surely find themselves serving their own interests as well as national interests if they support it to the best of their ability.

Yours faithfully,

LETCHWORTH. CLAUD W. SYKES.

U.K. Bacon Imports

IN view of the current "Grow More Food" and "Store More Food" campaigns, the following figures relating to the import of hams, bacon, etc., into the United Kingdom from foreign countries during the period May 1 to July 31, 1938, are particularly interesting. They are reproduced from the *B.O.T. Jnl.*, and are defined in the Bacon (Import Regulation) Order, 1934.

Country.	*Allocation.*	*Additional Quantities to be Imported, July, 1938.*
	*Cwts.**	*Cwts.*
Denmark	843,474	6,350
Netherlands	126,189	950
Poland	105,600	795
Sweden	62,430	470
Lithuania	39,185	295
Estonia	9,962	75
Finland	5,313	40
Latvia	9,298	70
U.S.S.R.	11,291	85
Argentina	9,298	70
United States of America	106,265†	800
Total	1,328,305	10,000

* Subject to amendment, in the case of certain individual countries, in respect of overshipments or undershipments in previous periods.

† Calculated at 8 per cent. In view of adjustments in connection with imports from the United States consigned through Canada, the United States will be allowed to ship at the rate of 8·1 per cent.

The Purchase of Herrings

A NEW contract was signed in March for the purchase of 10,000 barrels of herrings by Soviet trading organisations for shipment to the U.S.S.R. This new deal, like the previous two, is for East Anglian cured herrings.

The sale was effected by the British Herring Trade Association. It is considered that this last sale will considerably ease the problem of surplus stocks in this country. The herrings will be shipped from Lowestoft and Yarmouth during April.

West Indian Problems

TRINIDAD, with its population of 450,000, has an expanding oil factory which contributes much to its well-being. Jamaica, also, with its population of 1,100,000, has had an expanding banana industry which, though it is now menaced by plant disease, has done much to improve the standard of living of its people. But the smaller islands —Barbados, the Windward group (Grenada, St. Lucia, St. Vincent, and Dominica) and the Leeward group (Antigua, St. Kitts, Montserrat, and the Virgin Islands)—each depend almost exclusively on sugar, citrus, or cocoa. They have endured so many economic difficulties that the occurrence, in recent years, of a large number of serious disturbances need occasion little surprise. Barbados, especially, which has a rapidly expanding population of over 1,000 to the square mile, is a centre of extreme and increasing poverty, which can only be alleviated if new outlets for emigration are found. (*The Economist.*)

BEER HELPS THE FOOD INDUSTRY

The sale of certain foods soared almost as high as that of liquor itself when Prohibition was lifted in the U.S.A.

BEER, WHICH was relegalised by Congress and the President of the United States a little more than five years ago, has not only furnished a seven-billion dollar boost to business and industry but has given a new zest to American appetites and food habits.

This stimulation of American appetites has naturally left a beneficial impression on all purveyors of food—hotels, restaurants, delicatessens, grocers, provisioners, truck farmers and producers, jobbers and retailers of nearly every conceivable edible item.

The return of beer marked a boom in restaurant operation and, consequently, an upswing in local real estate, as thousands of empty stores throughout the land were converted into eating establishments to conform with licensing laws. Many thousands of new employees were added, not only by the new establishments, but also by the old restaurants and hotel dining-rooms which also enjoyed increased activity. Estimates have placed the number of employees added by the restaurant and catering industry alone at 250,000.

Relegalisation also increased the sales volume of the grocery and delicatessen industry, through accelerated sales of packaged beer and related food items.

The 223 million barrels of beer consumed by the public have given the retail food and food service industry a gross income of seven billion dollars which they have shared locally with real estate, labour, taxes and sundry other beneficiaries, including the many provisioners and jobbers supplying the related items for which there has been an increased demand since the foamy beverage returned.

Such related items as cheese, various cold cuts, relishes, salad ingredients, pretzels, crackers and many other ready-to-serve foods have enjoyed a boom they had not known during 13 years of prohibition. Grocers found it expedient to display this merchandise as a unit and sales mounted. To-day beer has taken its place in the refrigerator along with the staple foods the careful housewife keeps on hand for impromptu entertaining and for the family table.

Beer also brought the return to favour of the midnight snack and the art of Colonial cookery, which uses beer as an ingredient in many tempting dishes.

A recent survey has shown that the higher the income the more likely beer is found in the home . . . that in the $5,000-a-year or higher bracket, beer is in 50 per cent. of the homes. Beer has become accepted as a food beverage for the family in America and statistics support this fact.

Statistics prove that other branches of the food industry have benefited since the return of beer. For example, a 32 per cent. increase in the production of domestic cheese is recorded since 1932, according to the latest report on Milk Utilisation in the U.S., as issued by the U.S. Department of Agriculture.

In 1932, Prohibition's final year, America produced 4,883,000,000 pounds of cheese on farms and in factories. In 1933 cheese production rose to 5,469,000,000, and in 1936, the latest year for which complete government figures are available, production rose to 6,446,000,000 pounds. The gain of 1,563,000,000 over 1932 has been a boon to the American farmer.

Oddly enough, this same report discloses that milk and cream consumption has also increased. National consumption in 1932 was 3,669,971,000 gallons, while in 1936 it amounted to 3,707,280,000 gallons, an increase of more than 33 million gallons. Of even greater economic significance is that while producers in 1932 received 89 cents per 100 pounds for milk testing 3·5 per cent. butterfat, condensaries paid them 1·56 in 1936.

An effective picture advertisement for a prominent American dog food manufacturer.

INFORMATION and ADVICE

Tomato Sauce—Machines for Jelly Powders—Legal Definition of Cream—Drinking Straws—Sauce and Vinegar—Liquid Synthetic Cream—Lemon Barley (Cold Water) Powder—Apple Juice Analysis—Butter in Sealed Containers

Tomato Sauce

4,165. *Will you be good enough to let me have a recipe for a tomato sauce which can be filled cold without having to be sterilised?* (London.)

A typical formula for tomato sauce with which you can experiment is the following:

Tomato purée	25 gal.
Pale malt vinegar (16 grain) ..	8 ,,
Table salt	7 lb.
Gum tragacanth	1 ,,
White sugar	25 ,,
White pepper	8 oz.
Ground ginger	8 ,,
Ground nutmeg	4 ,,
Cayenne	1 ,,
Raw onions	4 lb.
Garlic	½ ,,

Place the gum in 1 gal. of the vinegar to soak for 24 hours. Add 1 gal. more of the vinegar to the gum, stir well. Peel the onions and chop fine. Place balance of vinegar in a steam pan, add sugar, salt, pepper, ginger, nutmeg, cayenne, onions, and garlic, also the gum. Stir well, add the tomato purée, bring to the boil, stirring all the time, and gently simmer for 20 minutes. Shut off steam and rub all through a fine sieve. Fill and cap.

Machines for Jelly Powders

4,164. *We are interested in machines for making jelly powders, and should appreciate it if you would kindly let us have a list of the names of the manufacturers of such machines.* (Greenford.)

The names of suppliers were given.

Legal Definition of Cream

4,132. *We notice that various types of cream are available on the English market usually referred to as Devonshire cream, coffee cream, household cream, etc., and wish to ascertain the legal definition of these creams respecting their butter-fat content and how many classes of cream with their corresponding definitions are recognised under the Food and Drugs Act.* (Middlesex.)

The percentage of milk-fat which cream should contain has not been authoritatively prescribed in this country. The clotted cream produced in Cornwall and Devon normally contains about 60 per cent. of milk-fat. Fresh, thick cream contains about 50 per cent. and imported tinned cream about 20 to 25 per cent. of fat. In the light cream now sold under such names as "breakfast cream", "coffee cream", and "fruit cream", the percentage of fat varies from about 25 per cent. downwards.

Many cream substitutes, containing fats of vegetable origin, are on the market. They are to be distinguished from "artificial cream", made in an emulsifier from butter and water or milk.

Drinking Straws

4,147. *Please supply me with any information you have about drinking straws—the narrow tubes which are used for drinking aerated drinks, juices and other cold beverages. I would particularly like to know the nature of the material used and the process of their manufacture, and names of firms which supply raw material and machinery for the same.* (India.)

We are sorry, but your enquiry is outside our scope. Numerous enquiries have produced little information. However, we suggest that you communicate with the makers of macaroni machinery, in Italy, who may be in a position to help you.

Sauce and Vinegar

4,178. *I shall be very grateful if you will please send me the following formulæ:*

Formula for manufacturing table vinegar.

Formula for manufacturing Worcester sauce. (Kirkee.)

According to our law here in England, artificial vinegar or dilute acetic acid must not be sold as table vinegar; only malt vinegar is given the term table vinegar.

Worcester Sauce Recipe.

23 lb. tamarinds (boiled with water and strained through a sieve).
2 gal. garlic in vinegar.
1 gal. shallots in vinegar.
6 lb. anchovies and 3 lb. salt.
6 gal. soy.
6 gal. ketchup.
2½ gal. chillies (in vinegar for a night).
10 oz. ground clover.
2 oz. nutmeg.
8 oz. pimento.
26 gal. No. 20 brown vinegar.
2 gal. lemon juice.
½ bowl gum.
Colouring.
12 lb. sugar.

Yield about 48 gal. Boil for 15 minutes, allow to stand 1 hour, and strain through hair sieve.

Liquid Synthetic Cream

4,195. *We shall be pleased if you can give us any information regarding the preparation (or manufacture) of synthetic cream (liquid). This is bought by bakers at prices ranging from 7s. 6d. to 10s. per gallon and can be whipped up as required like double cream.* (Glasgow.)

The type of produce you wish to make is a secret preparation. It is sometimes an emulsion of arachis oil, milk or skim milk, or probably milk powder.

Your best course would be to submit your problem to a technical man who has access to a homogeniser, and get him to make up a series of samples for your consideration.

Lemon Barley (Cold Water) Powder

3,996. *Can you give us a recipe for making this powder. The directions for the preparation of lemon barley water are: Put two teaspoonfuls of this powder into a glass, add cold water, and stir.* (Dudley.)

A lemon barley water such as you desire is made from powdered pearl barley, with the addition of citric acid, sugar, and oil of lemon. We regret that we have no formula for this preparation, but suggest that you experiment along these lines.

Apple Juice Analysis

4,197. *Will you kindly inform how to determine—*

1. *The acidity (malic acid);*
2. *Total invert sugar determination;*
3. *Calorific value;*
4. *Ascorbic acid content;*
5. *Protein content;*
6. *Tannin content*

of pure natural apple juice? (Manchester.)

(1) Acidity Estimation (Cruess, *Lab. Man.*).

Pipette 10 c.c. of juice into a flask and add 50 or 100 c.c. distilled water. Titrate against N/10 NaOH, using phenolphthalein as indicator. 1 c.c. of N/10 NaOH will neutralise 0·0067 gm. of malic acid.

(2) Total Invert Sugar (Cruess, *Lab. Man.*).

Clarifying the solution: Add to the cooled sugar solution small quantities of Horne's lead sub-acetate on the tip of a knife-blade, shaking after each addition until the solution clarifies sharply—that is, the solid particles settle rapidly, leaving a practically clear supernatant liquid. Fill to the mark with water, mix thoroughly and allow to stand overnight. Removing Excess Lead: Mix and filter about 50 c.c. through a filter-paper and add sufficient anhydrous sodium oxalate to precipitate all excess lead. Mix and filter again. Test the filtrate with a crystal of sodium oxalate to ascertain if free of lead. Precipitating the Cuprous Oxide: Add 25 c.c. of Fehling's solutions. Cover the beaker with a watch-glass and heat over a Bunsen burner so that boiling begins in about 4 minutes and continues exactly 2 minutes. Filter at once in a previously dried and weighed Gooch crucible, using gentle suction. (The asbestos should be digested previously with acid and alkali and washed with distilled water.) Wash all the red cuprous oxide into the crucible and wash with hot distilled water until free of soluble salts. Dry the crucible in an oven at about 100° C. for an hour or longer, cool and weigh. Calculating the Result: From the weight of cuprous oxide obtained find the equivalent weight of invert sugar from Munson and Walker's Tables.

Milligrams of cuprous oxide obtained—250·0.

Milligrams of invert sugar equivalent to—116·4.

Milligrams of original sample represented—

$$\left(\frac{25 \text{ c.c.}}{1{,}000 \text{ c.c.}} \times 10 \text{ gm.}\right)\text{—}250{\cdot}0.$$

Percentage of total sugar as invert sugar—

$$\frac{116{\cdot}4}{250{\cdot}0} \times 100\text{—}46{\cdot}36 \text{ per cent.}$$

(3) Calorific Value: A standard calorimeter is used.

(4) Ascorbic Acid Content (Cox, *Chem. An. of Foods*).

The estimation of ascorbic acid depends on the fact that a blue dye 2:6-dichlorophenolindophenol is decolorised by ascorbic acid, but not by any other substances known to occur in vegetables or fruit. Extract the ascorbic acid from a known quantity of the material, after due preparation, with 20 per cent. trichloroacetic, and give a final concentrate of about 5 per cent. Filter and dilute if necessary. A measured volume of standardised buffered solution of the indophenol is filtrated with the trichloroacetic acid extract until the red colour which this indicator assumes in acid solution is discharged. The dichlorophenolindophenol solution may conveniently be 0·08 gm. in 100 ml. of phosphate buffer solution of *p*H 7·2. It should be standardised against known ascorbic acid.

(5) Protein Content: You can use the Kjeldahl method or its modification found in any analytical textbook.

(6) Tannin Content: You could apply, among others, Stahlschmidt's method (*J. Amer. Off. Agric. Chem.*, **2**, 332).

In using any analytical method it is of course necessary to take due care in its application with reference to the substance being analysed—*e.g.*, unsuitable preliminary treatment of the sample for analysis may destroy the substance to be determined.

Butter in Sealed Containers

4,144. *Can you inform us whether butter (more or less free from casein), if processed in sealed containers, should keep free from rancidity indefinitely, or whether development of rancidity is unconnected with bacterial or other living organisms.*

The growth of micro-organisms, particularly moulds, enzymetic and chemical changes which cause rancidity, spoilage and off-flavours in butter, are favoured by moisture and warmth. It is not possible, so far as we know, to prevent their action indefinitely. To give good keeping qualities, the butter would require to be made from pasteurised cream, and have as low a moisture content as possible. If packed in tins it would be advisable to line the tins with greaseproof paper, seal under vacuum and store at a low temperature. Prepared in this way, it should keep for a reasonable length of time.

We hope to publish details of research into this problem at a later date.

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NEW COMPANIES

American and African Trade Company, Limited. (341472.) June 16. 77, Leadenhall Street, London, E.C. Importers and exporters of canned and dry goods; genl. mchts., etc. £25,000. Dirs.: L. Regray, 34, Rue Fontenelle, Le Havre, France; A. Chegaray, 55, Rue d'Ephremenil, Le Havre, France; B. Chegaray, 10, Rue Alphonse Martin, Le Havre.

Anchor Taverns, Limited. (341696.) June 23. To take over part of the bus. of innkeepers, hotel proprs., and licensed victuallers cd. on as "Anchor Taverns" by Barclay Perkins and Co., Ltd. £50,000. Dirs.: To be appointed by the subs.

Buttler (Smithfield), Limited. (341840.) June 27. Upper Dean Street, Birmingham. Growers and producers, canners and dlrs. in fruit and vegetables, etc. £1,000. Dirs.: Millicent M. Buttler, The Shanty, 47, Church Hill, Northfield, Birmingham; W. J. Tulk, 68, Stoneleigh Road, Perry Barr, Birmingham.

Coretyne Sugar Company, Limited. (F3,508.) June 2. Friars House, New Broad Street, London, E.C. Registered in British Guiana. To acquire the Plantation Albion cum annexis in Berbice, British Guiana, and to carry on the bus. of mnfrs. of sugar. $1,200,000. London Committee: C. A. Campbell, Underriver House, near Sevenoaks; R. W. Sharples, O.B.E., 19, Cadogan Place, S.W. 1; and two others.

A. J. Edwards, Limited. (341946.) June 30. 5, James Street, Covent Garden, London, W.C. 2. Fruit, vegetable, flower, and genl. produce mchts., etc. £10,000. Dirs.: A. J. Edwards, Bardwell Manor, Bury St. Edmunds, Suffolk; L. R. Edwards, The Chestnuts, Earith, Hunts.

Bath Fancy Bakery Company (Leamington), Limited. (340960.) June 2. To take over the bus. cd. on at 10, George Street, Leamington Spa, as "The Bath Fancy Bakery Co." £2,000. Permt. dirs.: R. C. Davis, 3, Hazelmere Road, Hall Green, Birmingham; Miss F. E. Davis, Broadway House, Warwick.

Frosted Foods, Limited. (341398.) June 15. To enter into an agreement with Frosted Foods Company, Inc., 250, Park Avenue, New York, for the purchase of patents and inventions pertaining to a process of quick freezing and apparatus for the same and all rights and interests in the said invention in the British Empire, Eire, Egypt, Holland, Denmark, Norway, and Sweden. £80,000. Permt. dirs.: E. T. Gibson and R. Ducas.

Home Sweets, Limited. (341632.) June 21. Lever Street, Wolverhampton. Mnfrs. of and dlrs. in sweetmeats, etc. £1,000.

Improvers, Limited. (341649.) June 21. Mnfrs. of and dlrs. in flour, yeast, flour improvers, etc. £1,000. Dirs. to be appointed by the subs.

Kay and Ess (Confectionery), Limited. (341924.) June 29. 38, Decima Street, Bermondsey, London, S.E. 1. Mnfg. wholesale and retail confectioners, etc. £1,000. Dirs.: D. A. King, 81, Datchet Road, Catford, S.E. 6; W. A. Blake, 50, Waterlow Road, Highgate, N. 19.

W. H. and J. Rogers, Limited. (341467.) June 16. Flour millers, etc. Ashley Mills, Bedford, and Castle Mills, Goldington, Beds. £20,000. Joint mang. dirs.: G. A. Rogers, Castle Mills, Goldington, Beds; C. H. Rogers, 34, Waterloo Road, Bedford.

Stocks' Empire Café, Limited. (341464.) June 16. Café and restaurant keepers, etc. £4,000. Permt. dirs.: H. Baxter, Eden Vale, 338, Maine Road Central, Morecambe and Heysham; E. Varley, 2, Lonsdale Avenue, Morecambe and Heysham; G. Brucciani, 7, Skipton Street, Morecambe and Heysham; J. I. Taylor.

R. Walton, Limited. (340218.) May 12. The Bakery, Dudley Road, Tividale, Staffs. Bakers, caterers, confectioners, etc. £2,000. Dirs.: A. R. Walton, Mrs. E. M. Walton, 298, Dudley Road, Tividale, Staffs.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

579,768.—**Cereal products for food.** THE QUAKER OATS COMPANY, Board of Trade Building, 141, West Jackson Boulevard, Chicago, County of Cook, State of Illinois, United States of America. November 3.

579,901.—**Bread, cakes, tarts, biscuits and confectionery.** THE CITY BAKERIES, LTD., 15-37, Clarendon Street, St. George's Cross, Glasgow. October 27.

580,571.—**Dried fruits, fresh fruits, and fresh vegetables.** BOCAR AND CO., LTD., 4, Bedford Chambers, Covent Garden Market, London, W.C. 2. January 5.

583,869.—**Salt for food.** PALMER, MANN AND CO., LTD., 5/6, Bucklersbury, London, E.C. 4. May 4.

584,019.—**Fruits.** BRADMORE'S ORCHARDS, LTD., Astor House, Aldwych, London, W.C. 2. May 4. Registration of this trade mark shall give no right to the exclusive use of a device of an apple.

585,885.—**Flour.** C. E. WOODROW AND SONS, LTD., Tower Roller Mills, Eleanor Road, Norwich. June 29.

AVALON.—585,619. **Canned fish.** SOUTH COAST FISHERIES, INC., 820, Ways Street, Terminal Island, California, United States of America. June 15.

BUTTRESS. — 585,586. **Flour.** SETH TAYLOR, LTD., Bankside House, Leadenhall Street, London, E.C. 3. June 15.

CHANTELLA. — 586,012. **Cheese and substances used for food containing cheese.** KRAFT CHEESE CO., LTD., Silverdale Road, Hayes, Middlesex. July 6.

CHOCLAFLOR.—585,121. **Edible preparations containing chocolate for use as flavouring in foods.** BRUCE STARKE AND CO., LTD., 16, Water Lane, Great Tower Street, London, E.C. 3. June 15.

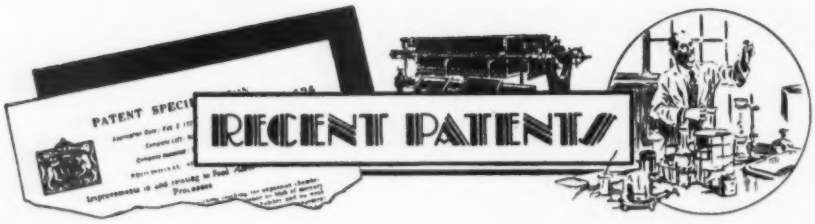
COUNTRY LANE BRAND.—585,195. **Evaporated milk.** DRIED MILK PRODUCTS, LTD., Dominion Buildings, 2, South Place, London, E.C. 2. (Associated.) June 29.

EDMEX. — 585,893. **Bread improvers, being ingredients in food.** EDME, LTD., 122 to 124, Regent Street, London, W. 1. (Associated.) July 6.

ENERVYTE. — 585,362. **A cereal food.** DERRICK KINGSLEY HORSFIELD and MARGARET CATHERINE HORSFIELD, trading as The Dean's Water Mill, The Dean's Water Mill, Lindfield, Sussex. June 15.

GAUNTLET BRAND. — 585,297. **Fish.** EDWARD ALEXANDER SINCLAIR, trading as R. Sinclair, Raik Road, Aberdeen. (Associated.) June 22.

GORSE.—585,792. **Margarine.** BENNINGA (MITCHAM), LTD., The Margarine Works, 33, Mortimer Road, Mitcham, Surrey. June 29.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

16508. Soc. Financiere Mercuria S.O.F.I.M.E.: Hermetic packing of goods to be protected from the access of moisture, etc. June 2.
16559. Hercules Powder Co.: Food products. June 2.
16627. Dienst, K.: Treatment of grain used for bread. June 3.
17164. Page, A. C.: Biscuit-making powders. June 9.
18017. Reid, T. F. H.: Apparatus for rolling meats. June 17.
18786. Berry, A. E.: Cereal products. June 24.
18917. Burgess, A. F. (Thomsen, C. Z.): Treatment of chocolate. June 25.
19355. Corn Products Refining Co.: Production of fatty acid esters from starch factory by-products. June 29.
19356. Corn Products Refining Co.: Manufacture of starch product. June 29.
19357. Corn Products Refining Co.: Precipitation of zein by spraying. June 29.
32250. Bennett, W. G.: Manufacture of yeast, etc.
32334. Martin, D.: Manufacture of ice-cream.
32426. Ware, C. J.: Fruit-juice extractors.
32440. Read, H. A. M.: Dairies.
32570. Farrer, J. O. (Continental Can Co.): Sheet-metal can, etc., containers.
32580. Kaufmann, M.: Covers for bakers' carriages, etc. (Germany, November 25, 1936.)
32618. Templeman, F.: Manufacture of tea preparations.
32792. Kustner Freres and Cie Soc. Anon.: Machines for dividing, etc., pasty masses. (Germany, November 27, 1936.)
32877. Turnbull, W. W.: Ice-cream cones.
33036. Beck, N. R.: Neck-finishing of glass bottles.
33102. Seitz - Werke: Bottle-cleaning machines. (Germany, November 30, 1936.)
33150. Rose, A. G.: Machines for forming cartons.
33257. Johnson and Johnson (Great Britain), Ltd. (Johnson and Johnson): Holders for cartons.
33750. Sivyer, L. W.: Apparatus for sampling cane-sugar.
33791. Simpson, S. W. M.: Vegetable, etc., dishes.

Complete Specifications Accepted

484,736. Kodak, Ltd. (Eastman Kodak Co.): Purification of soya-bean oil.
484,818. Leonard, F.: Drying, powdering, and preserving yeast in a live state for use in chemical and food products and the like.
484,993. Pollak, J. E. (International Patents Development Co.: Clarification of sugar solutions.
485,090. Corn Products Co., Ltd.: Products derived from barley.
485,166. International Patents Development Co.: Production of starch and related products from corn.
485,167. International Patents Development Co.: Treatment of corn for the production of starch and related products.
485,331. Miller, H. W.: Making vegetable milk.
486,670. Bensemann, E. H. T.: Attachment of fruit-grading and like machines to facilitate the inspection of the fruit being delivered thereto.
486,876. Beau May Process Corporation and Triggs, W. W.: Method of intensifying fruit or vegetable juice. (Addition to 469,011.)
486,898. Groves, W. W. (I.G. Farbenindustrie Akt.-Ges.): Manufacture of substances resembling vitamines from plants.
487,094. Niro Atomiser Aktieselskabet and Nyrop, J. E.: Method of producing milk-powder preparations.
487,187. Bailey, W. H., and Bailey, A.: Apparatus for rendering fryers' scraps and the like.
487,210. Waal, H. Lde.: Apparatus for drying tea leaf.
487,353. Neil, D.: Method of and apparatus for treating animal carcases after slaughtering.
487,367. Eastman Kodak Co.: Preparation of vitamin concentrate.
487,678. Kellogg Co.: Manufacture of ready-to-eat cereal foods.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

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477,670. **Coffee.** Fairweather, H. G. C. (Coffee Products Corporation).
In making coffee extracts the difficultly condensable aromatic constituents of coffee vapours are incorporated by scrubbing these vapours with cold, concentrated coffee extract. In carrying out the process, ground roasted coffee is extracted with hot or boiling water in a closed system to produce the coffee extract. This is concentrated and the vapours produced drawn off, cooled, and scrubbed with the cooled concentrated extract.

480,803. **Hydraulic presses.** Holden, Ltd., R. W., and Leuvenberg, E.
In the canning of hams and like foodstuffs each ham is placed in a mould of the same section as the tin into which the ham is to be packed, and pressed therein by a hydraulic press having a pointer on its platen to indicate on a fixed scale the height of the tin required to receive the ham. When it is desired to employ a series of moulds of different sections with a series of tins of corresponding sections, a number of scales may be provided on the member.

480,885. **Distilling, purifying, and preserving oils and fats.** Eastman Kodak Co.
In the high-vacuum distillation of oils, fats, waxes, and the like containing easily oxidisable materials such as vitamins A, D, and E, oxidation of these vitamins, as by absorbed oxygen or peroxides, is prevented by effecting the distillation in the presence of an anti-oxidant having a volatility approximating to that of the desired distillate; 0·001 to 1·0 per cent. is suitable. The anti-oxidant may be left in or removed from the collected fraction. Short-path high-vacuum distillation is preferably employed with distilling temperatures of 70° to 250° C. A mixture of anti-oxidants may be used, each having a volatility near that of the fractions to be collected. Anti-oxidants specified comprise hydroquinone, pyrogallol, furfurol, pyrocatechol, hydroxyhydroquinone, *p*-amino-phenol, 1-2-4-trihydroxybenzene, 2-amino-5-hydroxytoluene, benzyl-*p*-aminophenol, *p*-hydroxy-phenyl-morpholine, dibenzyl-*p*-aminophenol, 1-5-dihydroxynaphthalene, 2-4 and *p*-*p*¹-diaminodiphenylamines. Fish liver and body oils to which the process may be applied comprise tuna, jaw, ling, cod, halibut, salmon, herring, mackerel, sardine, and menhaden. In one example 100 litres of cod liver oil and 1 to 10 gm. of 1:2:4-trihydroxybenzene are distilled under short-path conditions at 0·001 mm. of mercury. The chief vitamin constituent of the respective fractions collected at 120°, 150°, 170°, and 200° C. is vitamin A, vitamin D, vitamin A esters, and vitamin D esters respectively. The trihydroxybenzene collects mainly in the early and middle fractions.

480,928. **Albumen.** Fischer, H.
Albuminous compounds having the properties of white of egg are made by treating coarsely crushed albuminous seeds (preferably after the extraction of oil therefrom) with calcium or magnesium hydroxide and water, separating the solution, and adding acid until the dissolved albumen is on the point of being precipitated. Alternatively, the albumen may be precipitated, and then calcium or magnesium hydroxide is added to the precipitate until it is just redissolved. An example describes the treatment of extracted soya meal. The solution may be evaporated to dryness under reduced pressure.